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Some Aspects of the American Recovery Programme

By Sir William H. Beveridge

AN IMPRESSION AND A POSTSCRIPT

The National Industrial Recovery Act (apart from the public works side) appears to embody five distinct ideas.

1. Rationalisation of industry by trade associations with escape from the anti-trust laws.
2. Prohibition of sweating by the fixing of minimum wages, with special but not exclusive reference to conditions in the south.
3. Collective, in place of individual, bargaining between employers and workers.
4. Reduction of unemployment by shortening of hours.
5. Raising of wages so as to increase consumers' purchasing power.

The first three of these are wholly or mainly measures of reconstruction, rather than recovery from the immediate depression (though no doubt the movement towards them has been stimulated by the depression). The last two are mainly measures of recovery rather than reconstruction (though no doubt it is contemplated that in a permanently reconstructed society, with plants working at full capacity, hours will be shorter and unemployment will have been turned into leisure).

There is probably a good deal to be said for some move in the direction of each of the first three objects named above as measures of reconstruction, though there are also some dangers. As regards the first, though rationalisation of industry and economic planning are popular panaceas to-day, the practicability of economic planning in an individualist system (that is planning short of complete socialism) cannot be taken for granted; the codes, moreover, are clearly introducing innumerable new rigidities into the economic structure which may prove very harmful in the next trade depression.

As regards minimum wages to prohibit sweating, they have economic justification, but their probable effects in bringing about a redistribution of industry and causing unemployment in the former low-wage districts must be borne in mind; this is a case in which pursuit of reconstruction may obstruct recovery. As regards collective bargaining, while formally this amounts only to instituting in America a practice now substantially universal in Britain, it must also be remembered that, in leadership, spirit and methods, there is still a wide gap between British trade unions and American trade unions. There are troublesome times ahead for American industry before its trade unions and their leaders are educated up to the responsibilities of industrial democracy.

At the present crisis of the recovery battle, however, it is inappropriate to discuss at length these reconstruction problems. The issue of recovery is itself too urgent. The fourth and fifth of the policies named above, which have been adopted as the main levers for immediate industrial recovery (" more and fatter pay envelopes to our workers "), appear to be based upon an insufficient study of economic history and a misreading of the nature of the trade cycle.

The present trade depression in America is not the first depression in its history. The boom which developed after 1926 broke only late in 1929. If, in 1930, we had looked back to the history of former cyclical fluctuations, we should have found no warrant at all for the prevalent idea that 1930 was the bottom of the depression, and that recovery was likely in the next year. No trade cycle in past history has been as short as this. The normal period from boom to boom, or from depression to depression, has been five to ten years, say seven as an average. If, when the boom broke in 1929, we had looked up our economic history textbooks, we should have expected prices and production to continue falling till 1933, that is to say for just about the length of time that they did fall. Failure to treat what was happening as a recurrence of the trade cycle has given us all a wrong sense of proportion about what was happening.

The present movement, though more violent than anything known before, is broadly of the same nature. The upward swing of the trade cycle involves a relative over-production of capital goods on a credit inflation. When the boom breaks the depression falls mainly on the industries producing those goods, while consumption in the industries making directly for consumption declines relatively much less. The cure for depression in the past has come by waiting till the fall of costs (through reduction of wages and interest rates), combined with the physical wearing out of capital goods, so as to call for their replacement, appears to make investment in renewed production of capital goods profitable once more. The savings which, during the depression, have tended to be idly hoarded begin to flow out into investment again. There is (under present banking systems) a reflation followed by an inflation of credit. This leads to a rise of prices and that in turn to a rise of wages. Credit, prices and wages begin to move upwards again successively *in that order*.

That is broadly the way in which in the past all trade depressions have given place to recovery. The present depression, though more violent than previous depressions, appears to be essentially like them in origin and in character. It follows on an inflationary boom in which the capital structure has been unduly expanded; it has involved a contraction of employment mainly concentrated on the industries producing capital goods; consumption has fallen off relatively little.

The present depression differs little in character from past depressions, and recovery would in time come naturally in the same way as before. In seeking to hasten recovery, the prudent course would be to work with the natural forces for recovery; in medical practice a wise doctor treating the illness of a patient of good constitution tries to assist Nature and to work with her, not against her.

As a treatment for trade depression, the N.R.A. programme departs from this wise principle. It directly reverses the normal course of recovery, by pushing up first wages, that is to say costs of production. This is a highly dangerous experiment, whose dangers have been intensified by the simultaneous attack upon investment through the Securities Act and through the policy of monetary instability, announced in the President's radio speech of October 22nd. In the past history of the trade cycle, savings flowing into investment have been the horse which, under the stimulus of hope for profits (the carrot), has begun to move upward out of depression and has drawn after it, first, prices (the cart), and, later, wages (the trailer). The procession has gone in that order—carrot, horse, cart, trailer.

The N.R.A. programme represents impatience with this normal process, and impatience has taken the form of jumping on the trailer and trying to push or kick it forward from behind in the hope that this would somehow wake up the horse and cause him to move. This plan has been complicated internally by the arrangement that while one set of people (the Labour Advisory Board) were pushing forward upon the trailer (wages) another set of people (the Consumers' Advisory Board) should be brought in to pull backward on the cart (prices). In this contest the pushers forward have naturally been stronger, and there is no doubt that the cart would have jolted forward and hit the horse; this might conceivably have waked him up and started him moving (though I am not sure in what direction he would have moved). But two further complications have been introduced into the plan from outside, first, by the Securities Act (this amounts to putting hobbles on the horse's feet) and, second, by the monetary policy of October 22nd. (This amounts to tying a sack over the horse's head so as to stop him from seeing carrots or anything else.)[1] Not unnaturally, the

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[1] The objects of the gold-buying policy have never, so far as I know, been explained directly by the President or any of his advisers. In his radio address of October 22nd, the President spoke of the need for protecting the dollar from manipulation by foreign speculators and of his intention to establish his own market for gold, buying and selling as required. But these statements can only relate to the ultimate project of establishing a " commodity dollar " of stable purchasing power. They throw no light on the actual policy of buying gold at a gradually advancing price.

The actual policy must apparently be explained as an attempt to apply the " Warren Theory " that prices represent ultimately a relation between the stock of precious metal and the supply of commodities and that if the dollar price of gold is raised the dollar price of commodities will rise in accord. This theory would be worth trying if we lived in the Middle Ages, when precious metal (in those days silver coin) was the only form of purchasing power; the big upward and downward swings of prices in those earlier times are clearly connected with changes in the stock of precious metal. But the theory has hardly any relevance to times when the principal type of purchasing power is neither gold (nor notes representing gold) but credit. The difference between the prosperity and high prices of 1929 and the depression and low prices of 1933 lies not in the stock of gold or its distribution (which have altered relatively little) but in the state of credit. When, as in America to-day, gold is not the main purchasing power, indeed is not purchasing power at all, the gold-buying policy is meaningless, except as a tortuous way to devaluation.

Devaluation of the dollar in terms of gold will of course raise the dollar prices of exports (e.g. cotton or tobacco) to countries which remain on gold (France) or adjust their currencies to gold (Britain at present). But its effect on internal prices is small and uncertain and may be negative, because in the internal market so many other factors are at work, e.g.:

1. N.R.A. by increasing wage costs of production is tending to raise prices of manufactured goods (in the proportion that labour enters into them) relatively to raw materials. This is what the farmer is finding and disliking.

2. A.A.A. by restricting production is driving up prices of farm products, though whether, apart from the relief policy of buying food out of loans, it will increase farm incomes more than they would have risen anyway is uncertain.

3. Expansion of government expenditures out of loans on public works, relief, etc., tends to raise prices.

4. Discouragement of business expenditure through monetary uncertainty, the

horse has been badly discouraged; there has been no movement at all; more accurately, the movement has been backwards, a slipping back into the morass under the weight added to the trailer. Industry, so far from recovering, has been rapidly going down hill ever since July.

In the course of my visit I have heard only two rational defences or explanations of " more and fatter pay envelopes " as part of the recovery programme.

The first was Mr. Owen Young's statement that re-employment through shortening hours is to be regarded as a measure not of recovery but of relief, a means of making work for the unemployed as an alternative to doles. The answer to this is that though there may be a case for making work for the unemployed in place of giving them money doles, it is irrational to finance this relief work by a direct tax on industry. Even those who support the putting of the unemployed in a depression upon work rather than doles, insist rightly that the cost of the work shall be met by loans and not by taxation.

The second explanation was given incidentally by Professor Schlichter of Harvard, in a paper to the Academy of Political Science on the economic implications of the shorter working week. While in the main severely critical of reduction of hours and raising of wages as a means of recovery, Professor Schlichter argued that in some ways the circumstances of last March were abnormal, that the demand for labour had got so low as to be inelastic, and not subject to further contraction through increase of costs, and that, as employers were declining to put their idle balances into circulation through increasing production, it was perhaps a legitimate gamble for starting the machine again to compel them to turn those balances into wages.

Theoretically it would be unsafe to say that there was no chance at all of this device succeeding, if it had stood by itself. In complicated diseases there is always a thousand-to-one chance that an entirely unorthodox remedy will help.

Securities Act, and the difficulty of making profits, causing balances to pile up in the banks in place of becoming active purchasing power, tends to lower prices.

The last of these is in itself a more important influence than the other three put together, and while it lasts will probably make it impossible for both prices and production to increase. Either prices generally will rise little, or if they rise will involve restriction of activity.

Of course an inflation panic, if it came, i.e. a flight from a rapidly depreciating dollar into commodities, would raise prices. Up to the present it has not come and there is a kind of stalemate. The Administration programme has destroyed business confidence without causing a panic, and prices (except for export) have moved relatively little.

In the terms of my simile, this amounts to saying that there was just an off-chance by jolting the trailer, and so the cart, to wake up the horse and make him think that there was a carrot ahead of him. Actually, as the horse was lamed and blind, there was no chance anyhow; the device of forcing up wages did not stand by itself. But even apart from this complication through the Securities Act and the monetary policy, I do not believe that Professor Schlichter's rationalisation of the programme (which he did not himself take very seriously) ought to be taken seriously by anybody. Even if there were ground for the unsupported assertion that the demand for labour had become inelastic at the March level, the plan was directed to raising that demand into regions where it would naturally become elastic again. Again, while undoubtedly in March there were idle balances in the banks, it does not follow at all that these belonged principally to employers, or could be used by them; it is certain that a large number of employers had no balances at all, and no chance of borrowing idle funds.

Professor Schlichter's own conclusion appeared to be that the " gamble " was never really tested out because the expectation of inflation on the departure from the gold standard in April itself produced the necessary upward movement, and the N.R.A. programme starting in July was wholly out of date.

For my part, I cannot now reach any other conclusion than that the N.R.A. programme of shorter hours and higher wages in all industries is an obstacle to recovery rather than an aid. The programme means that employers all over the country have had their costs of production raised, while the prospects of their recovering those increased costs remain obscure.

One of the great corporations which in July was losing money at the rate of $30,000,000 a year, has had its loss increased annually by $24,000,000 to $54,000,000 through the re-employment and wage programme. This corporation, being rich, is for the moment able to meet that loss, but obviously cannot go on doing so indefinitely.

Another firm, in the packing industry, told me that the N.R.A. programme had added $12,000,000 a year to their costs. I asked whether they could recover this without raising prices, to which they replied that they could do so if they got a 20 per cent. increase in consumption. There is, of course, no possibility of a 20 per cent. increase in consumption in the normal course of the market for pork products. This $12,000,000 comes through the N.R.A. alone; the processing tax will involve a further increase of prices unless the packers succeed in throwing the whole of it back upon the farmers.

Exactly how serious an obstacle to recovery is presented by this premature increase of wage costs, it is hard to say. The increase has fallen unequally on different employers, industries and regions. Very different views have been expressed to me as to the relative importance of this factor in delaying recovery and of the two other factors named above: the Securities Act and the monetary policy. While all three factors are at work it is hard to disentangle their consequences.

The broad result up to date of the recovery activities is certainly disquieting. When hours are being shortened and wages raised by codes, business recovery cannot be measured by numbers employed and pay rolls. The real test of recovery is business activity. From the middle of July, when the N.R.A. began, to the beginning of November, business activity, as measured by the *New York Times* index (steel production, automobile production, freight car loadings, lumber production, electric power consumption, cotton forwardings), has declined almost as fast as it went up from March to July. By the week ending November 4th two-thirds of the gains from March to July had been lost. The last week, to November 11th, shows a check to the fall and may be a precursor of improvement. But once or twice before, since July, there has been such a check for one week, after which the fall has been resumed. Two or three more weeks of a fall such as marked October would bring the index back to the March level. It should be added, as bearing directly on the N.R.A. theory of recovery by increasing *consumers'* (rather than investors') purchasing power, that the department store sales for October (published by Federal Reserve Board on November 8th) are very disappointing. In dollar value (allowing for season), October 1933 sales were one point down on September 1933, and were exactly equal to October 1932. As the prices of 1933 were materially above those of 1932, this means that the volume of sales was materially down.

The adoption of perverse treatment for depression through the N.R.A.—working against Nature instead of with her—is the more unfortunate, because other lines of treatment—working with Nature and not against Nature—have throughout been open to the Administration and have, in fact, been adopted by it at the same time. While it is probably true that, once a cyclical depression of trade has begun, it cannot be stopped altogether by any Government action (the only certain preventive of depression is to prevent the preceding boom), there are things which a government can do to mitigate depression and hasten recovery.

First, the government, through judicious expenditure out of loans, particularly though not exclusively in industries making capital goods, can expand purchasing power through government investment, when private investment is blocked. In terms of my simile, this amounts to putting a trace horse (who needs no carrot of profit) to help move the cart when it is stuck. This is sensible procedure. But the simile suggests also its limitations. Unless one aims at a completely socialist state, government investment cannot take the place of private investment. One cannot rely on the trace horse alone ; one must take the hobbles and the sack off the other horse and get him pulling; the trace horse is only there to give the first pull, and if the strain is too great the traces (i.e. government credit) will break. In plain terms this means that though a rapid growth of government expenditure and debt is now needed, any appearance of extravagance in expenditure may defeat its own object by destroying Federal credit.

Second, a government can help to reduce costs of production by bringing about a lower rate of interest on investment. In Britain, one of the obvious stimulants to our recovery now proceeding has been the war loan conversion. Lowering by 30 per cent. the rate of interest on this great block of government indebtedness has affected rates of interest generally; one business after another is refinancing at lower cost; the lower rate of interest has made all the difference in the world to the building industry, which is now getting active. In the United States of America, the part to be played by the government is different and more positive. The Federal debt is much less and the rate of interest thereon is low. Federal credit can be used, as to some extent it is being used, through the Reconstruction Finance Corporation, to help the refinancing at lower interest rates of many other kinds of indebtedness—farms, urban property, railways, etc. This is sound policy that ought to be pushed as rapidly as possible into as many fields as possible.

But here again we run up against the monetary policy, and fear of inflation. Expectation that the dollar is going to depreciate markedly in relation to commodities obstructs refinancing; holders of mortgages become less willing to exchange their mortgages on real estate for government dollar bonds. More important than that is the effect on government bonds themselves; if fear of inflation once really gets hold, Federal credit will dwindle and disappear. No one will willingly lend dollars which he expects to be worth much less when they are returned.

The President is committed to vast expenditures which can not be met by immediate taxation. The remaining alternatives are borrowing and printing. He should realise and act at once on the realisation that these alternatives are mutually exclusive. One cannot inflate by printing, or even threaten to do so, and borrow at the same time.

The President has to choose between printing and borrowing. He has also to choose (and choose quickly) between socialism and capitalism. If recovery means recovery to capitalism—to an economic system, that is, in which the main driving force will be the initiative of individual owners of means of production, rather than to completely planned socialism of the Russian order, the essential base of capitalism must be restored, that is to say, the hope of making profits through investment in roundabout methods of production. Reasonable stability of money and the immediate abandonment of the policy of fog announced by some of the President's advisers in defence or explanation of his Sunday night broadcast are essential. Under the new strategy for the battle of recovery the only strategy which seems to hold out any chance at all of success, and that only if it is adopted without delay, embodies the following four principal lines of attack.

1. Announcement that the dollar, having now reached about the point where the President wished to see it, is going to be stabilised at about that point in relation to gold. This does not mean that the dollar should be formally put back upon gold. It does not mean that the point now chosen will be exactly the point to be adopted in future. It does not even mean committing oneself to a final return to a rigid gold standard. If the announcement of stability at something about the point reached at the moment of the announcement were accompanied by an announcement of intention to negotiate with an open mind with Britain (and possibly France) as to the future relations of the dollar and sterling, in other words, if the era of irresponsible experimentation were unequivocally declared to be at an end, probably enough would have been done to restore monetary confidence. On the other hand, the announce-

ment should make it clear that the powers of the government will be used to prevent the dollar from rapidly appreciating again.

2. Announcement of an intention, through appointment of an expert impartial committee whose membership should command the confidence of the business and financial world, to report upon the whole financial and banking structure of the country, including reconsideration both of the Glass-Steagall Act and the Securities Act.

3. Free use of federal credit to re-finance as large a part as possible of the internal debt of the country at a lower rate of interest.

4. Speeding up of government expenditures on the lines of the public works administration. The one part of the N.R.A. programme which is in accord with the known facts and normal theories of the trade cycle is the public works expenditure, less as a means of finding work than as a means of putting government purchasing power into action at a time when private investment is dormant. But public works of a useful character, conducted with due regard to efficiency and economy, are not easy to get going and may prove too slow in action. On the other hand, public works or relief measures which are not carefully designed and appear only to be excuses for extravagance may undermine federal credit.

Frankly, the position has now been made very serious. It may prove that there is no way out without a real inflationary crash. On the other hand, the forces for recovery may be strong enough to triumph over all obstacles. America may be strong enough to recover from the recovery programme. A few weeks or months will show.

To-day it is possible to see the forces working for and against recovery, but not to judge their strength. For recovery, the main hope is the immense natural strength of the patient, aided from without by recovery in other countries; from within by the " natural " treatment through public expenditure out of loans and the re-financing operations. Against recovery are the three cardinal mistakes of monetary instability, the Securities Act, and the " more and fatter pay envelopes." The first two mistakes can be corrected by simple withdrawal. The last cannot be so corrected. Even if the President wished to drop this element in his programme, he could not do so without strikes amounting to insurrection throughout the country. Even if N.R.A. were declared unconstitutional by the Supreme

Court and the codes became unenforceable at law, the wages and hours just established would remain. The industry of the country is saddled with the higher dollar costs of production. It must be made capable of meeting them by a rise of dollar prices following an increase of purchasing power in action. To get that quickly enough by restoration of business confidence and an expansion of government expenditure seems the only alternative to getting it by an inflation which, by undermining Federal credit, would remove one of the few pillars that is still upright in the American economic system.

Lexington, Kentucky, *November* 18*th*, 1933.

POSTSCRIPT

The article printed above was written in America at the end of a four-weeks' visit, beginning October 21st, as a memorandum of impressions rather than as a considered judgment. Three months later it is still, of course, too early for any such judgment. This postscript is confined to comment on four points:

1. The memorandum deals only with the problem and conditions of immediate recovery in the United States from the present depression. It involves no judgment, favourable or unfavourable, on the far-reaching reconstruction of economic and political institutions that seems to be forecasted by many of the measures now taken or announced.

2. The memorandum and note deal only with the industrial and, to a very slight extent, the financial side of the Recovery Programme: they say nothing at all about the agricultural side or the relief side, including the Civilian Conservation Camps and the Civil Works Administration. The ambitious plan of raising the prices of agricultural products relatively to other prices, by an organised and general restriction of agricultural production, is an experiment whose development must influence the whole future economic system in America. At the moment, like the relief expenditure, it is significant also as a means of putting into action purchasing power provided from government loans.

3. The comment made in the memorandum on the operation of the Securities Act, whether or not it is justified in fact, is more definite than my information warranted. It rests on opinions expressed to me by persons of judgment and impartial attitude rather than on study of the terms of the Securities

Act. The principle of proscribing deliberate or negligent misrepresentations in the process of inviting investment from the public is, of course, beyond question. Whether the Securities Act carries this principle either too far or too suddenly into American life I cannot definitely say, but whatever final judgment is passed on this matter, the practical proposal made in my memorandum stands. An investigation and report by a strong, impartial committee would serve the purpose equally well, whether it led to an amendment of the Securities Act or whether it led to an authoritative statement that no amendment was required and that the Act, in fact, imposes no hindrances to genuine business.

4. At the date of my memorandum, the decline of business activity from the middle of July had just been halted. Since that date the movement has on balance been upward; the *New York Times* Index, which after rising from its minimum of 60 in mid-March to 98 in July had fallen to 72.5 on November 4th, stood on February 3rd at 78.4. The outlook is certainly more cheerful than at the time of my visit. Presumably the policy of government expenditure has begun to have effect; wholesale prices, after showing hardly any movement for two months after the adoption of the gold-buying policy, show signs of moving upward. This fact of lavish government expenditure is the background against which all other measures of recovery or reconstruction have to be seen. By what methods it will be possible to make the transition from government-induced recovery to normal trade activity, and whether this transition will come soon enough to make recovery from now onwards continuous and assured, is the main problem of the immediate future.

London, *February* 12*th*, 1934.

On Medieval History as a Social Study[1]

By Eileen Power
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The holder of a Chair of Economic History in a school of social sciences finds himself faced at the outset by a problem of integration. In less specialised universities or university institutions, where all the arts and sciences are gathered together, he can perhaps afford to pursue his way by an inner light of his own, not very profoundly affected by what the physicist is doing on one side of him or the classicist on the other, because the roads upon which they move are widely separated from his. But a Professor of Economic History in a school devoted specifically to the social sciences cannot look upon his department as a separate entity. He is bound to regard himself as a co-worker in a common field, his subject as a companion-study both to economics and to sociology, since the object of all these social sciences is the same. They seek to elucidate the present by the discovery of how things work. Their common watchword is the watchword of the School : *Felix qui potuit rerum cognoscere causas.*

It is true that the relationship between the three studies has sometimes been distinguished by hostility as well as by co-operation. Professor F. H. Knight, writing recently in an American journal, remarked on the unsatisfactory result of polemics as to what it means to explain social phenomena, in which one group of students seem to be in possession of the problems and another in possession of the data, and the two are living in separate universes of discourse.[2] This separation among students whose ultimate aim is the same has, I fear, been due (in part at least) to a lack of mutual esteem, arising from an imperfect understanding of each other's subjects and methods. Their relations are too often those of the good and the clever in the rhyme. The historians are so hard on the sociologists, and the economists so rude to the historians, that any improvement in the world of social science seems almost beyond human hope.

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[1] An Inaugural Lecture delivered at the London School of Economics and Political Science on January 18th, 1933.

[2] F. H. Knight. "Historical and Theoretical Issues in the Problem of Modern Capitalism," *Journal of Economic and Business History* (1928), i, p. 120.

What, we may ask ourselves, is the true relation between social history and sociology ? It must be perfectly plain that a science concerned with the study of man in society must turn to history for one of its most prolific sources of data. Yet if we examine the best works of general sociology we shall discover that the use which they make of historical evidence is comparatively small, and that those chapters in which they deal with it are usually inferior to the chapters in which they deal with anthropological evidence. They draw their best material from contemporary field-work among primitive societies or in Middletown, but the space between the Trobriand Islanders and Main Street is a howling void, and the whole process of change in time is to a great extent shirked. For this I think the blame must be placed not upon the sociologist, but upon the historian. The former cannot make use of the latter's evidence, because the historian has rarely asked himself the questions to which the sociologist wants an answer. The fact is that, in England at any rate, while historians have always regarded the moral sciences and have latterly regarded economic science as perfectly respectable, they have not yet been willing to admit the respectability of sociology. The result has been unfortunate for themselves as well as for sociology. It has led them to produce what they call social history perfunctorily and without a knowledge of the theoretical problems involved, with the result that the subject is justly held in disrepute as vague and spineless. Too often it is a mere adjunct to political history, a backcloth like the famous Chapter III of Macaulay, or a tailpiece like those paragraphs on " the life of the people " which are sometimes tacked on to the end of each chapter in school text-books. Properly defined, social history is, of course, the very reverse of this. It is a structural analysis of society, a line of approach to historical investigation which requires as rigorous a mental discipline and as scientific a methodology as any of the longer-established branches of history. It is not that we are without examples of what social history can be when systematically treated. It is unnecessary to go as far afield as the work of Weber and Sombart for an illustration ; that vast integrated study of Local Government, in which Mr. and Mrs. Webb have made all the social sciences their debtors, is an outstanding one; and in another sphere the work of Professor Tawney shows how illuminating the consciousness of a problem can be for the study of history. Nor do I despair of the rise of a school of sociological historians in this country. The English are adept at two things. They have M. Jourdain's gift for talking prose unawares; and while in learning, as in politics and morals, they are mortally afraid of names, they have a healthy capacity for swallowing facts. We must make allowances for the race which disguises the white man's dividend as the white man's burden, and while historians will no doubt continue to meet the charge of writing sociology with the indignation of a Victorian matron defending her virtue, the best of them will increasingly write it under the name of social history.

In the case of economics the boot is on the other leg, for the virtuous recoil comes from the economist, who smells a return to a bankrupt *Historismus* and rushes into the somewhat antiquated arms of Windleband and Rickert for defence. Well, we have all herded swine with the Hegelians, as Heine put it; and (I would add) if not with the Hegelians with the Kantians. It is apparently easier to detect the " Hegelian twaddle " in Marx than the Kantian twaddle in Rickert. I shall endeavour to placate the economists by admitting that the economic historians have not fed them with pearls. The Historical School took far too much upon itself. It was mistaken in supposing that an inductive method could dispense with deduction in economics, while economic history, on its side, has suffered, just as social history has suffered, from the fact that it has not always known what questions to ask itself. The complaint of the economist that the economic historian mistakes the nature of some of his own problems through his inadequate knowledge of economic theory is often justified; and there is no doubt that the more perfected deductive method of the economist is an essential component in any methodical study of economic history. With this handsome admission I may, perhaps, be permitted to suggest that the recoil of the economist from the historical method, as an alternative line of approach, has gone too far. A purely deductive science of economics has its limitations and dangers. In so far as the laws of economics are formal and deal with formal symbols, they are inapplicable to economic reality, and before they can be applied or verified, they require the introduction of evidence drawn from the economic past, as well as from the economic present. If, on the other hand, the economist denies the social and substantial character of his science so completely as to hide his head amid a crowd of stars and consort solely with the higher mathematicians (whose speech is a tinkling symbol) then no *Methodenstreit* arises, because the spheres of economist and historian coincide at no point. Nevertheless, however much the economist may eschew a social purpose, we do have an hallucination—*nous autres*—that his voice is raised in the discussion of actuality. The pure economist is not so pure when it comes to controversy. If he will forgive me the expression, he is something of an economic *demi-vierge*. ' "History shows," commences the bore at the club, and we resign ourselves to the prediction of the improbable.'[1] Very true; but "Economics shows," commences his twin brother, writing to *The Times*, and we resign ourselves to two rival counsels of the unattainable. Nor indeed do I blame even the purest of pure economists for these excursions into the dusty realm of reality. The essentially social character of much of his subject-matter robs it of the impersonality of physics or mathematics; and if his method be exclusively formal he tends not to rise to the position of the pure scientist, but to degenerate into that of the medieval scholastic, playing with his version of " How many angels can stand on the tip of a needle "—or, it may be, of a gold point.

I believe that anthropologists, sociologists, economists and historians are all to-day alive to the necessity for an integration of their labours, based upon a comprehension of each other's objects, capacities and methods. If each recognises what he properly can and cannot do, and at what point he requires the co-operation of the others, we need not be without hope that something worthy of the name of a social science *par excellence* may emerge. But if we are to find that " dependable uniformity and regularity " in the flux of phenomena, the discovery of which is the common object of physical and social sciences alike, we can only do so by a co-operative effort. And I cannot refrain from quoting here the words of one of the wisest men who ever taught in this School, Professor Allyn Young. Citing a remark of Mill that in the study of man and society " the besetting danger is not so much of embracing falsehood for truth, as of mistaking part of the truth for the whole," Professor Young added. " These are words for all inquirers in the field of the social sciences to remember. Our work is retarded and our intellectual energies are dissipated in useless quarrels, because of our intolerance of methods and points of view other than our own. There are only two things of which we have a right to be intolerant, the first is positive errors of fact or of inference, the second is intolerance itself."[1]

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[1] L. Robbins, *An Essay on the Nature and Significance of Economic Science* (1932), p. 74.

In speaking to you, then, about social and economic history, I am speaking about something which I conceive to stand in an integral relationship with the two studies of social and economic theory. Social history is, of course, a wide subject, and under it may be included interpretative studies whose aim is somewhat different, such (for example) as those illuminating books in which Dr. Coulton (a great scholar and a great humanist) has made medieval life live again. But the main business of the historian whose work lies in a school of social studies is to contribute his data and the assistance of his method to the general purpose of elucidating the present. We know that the object of economist and sociologist is the study of certain spheres of human behaviour, with a view to establishing the laws which govern relationships within those spheres. It seems to me that the business of the social-economic historian is to demand of his material the questions which they want answered, to the end that observation and comparison may be integrated with more deductive methods into a single scientific process. For the substance, of which they seek to descry the forms, lies spread over the field of time as well as of space, and neither can proceed to a complete mastery of his science, without taking into his calculations that vast section of the field which lies in the past. I propose, therefore, to begin by examining the method by which the social historian ought to proceed and the nature of the contribution which he may hope to make.

The first essential is to ask the right questions. This is not nearly so easy as it sounds and in order to pose the right question the social-economic historian requires a theoretical equipment. As Sombart has remarked, "No theory, no history." The theory, however, must be relevant to the subject, which a good deal that passes under the name of economic theory is not. Nor is it only the economic theorists who are to blame. Economic historians, on their side, have often approached their subject either with no theory at all, or with a theory that is inappropriate to it, a legal, an institutional, or a political theory. This has produced many valuable collections of facts and has deepened our knowledge of legal, institutional and political development, but it has not given us economic history in any valid sense of the term. Vinogradoff's brilliant studies of the medieval manor are written from a legal rather than an economic standpoint, and the great work of Cunningham, to which we are all indebted as a piece of magnificent pioneering, is largely not an economic history but a history of economic policy.

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[1] Allyn Young, "Economics as a Field of Research," *Quarterly Journal of Economics* (1927), xlii, p.6.

The second ingredient in a satisfactory method is perhaps too obvious to mention; it is the necessity for the historian to examine his own premises, before he starts trying to find an answer to the questions which he has posed. Professor Tawney has recently pointed out that while the scientific historian habitually criticises his sources, he usually fails to criticise his concepts with anything like the same rigour. Our premises rarely get examined, because we are often quite unconscious of them. If they were I cannot resist the impression that the result would be a notice: " These commodious—these much too commodious—premises to let."

But given that our questions have been asked and our premises examined, what is the most useful method by which the social historian can proceed towards the discovery of an answer ? I am not, of course, speaking of a method of historical research. That is a matter of technique, the job of the brickmaker. We historians all have to learn how to make bricks, often with very little straw—often with the one straw which shows the way the wind is blowing. But what I am speaking of here is something quite different, a method not of historical research, but of historical analysis and synthesis—the architect's job as compared with the brickmaker's. If we turn historical research into historical narrative, we are too often content. Yet the mere accumulation of historical data, even of a statistical character, may be " a fit occupation for an economist in his dotage," but it is certainly no occupation for an historian in his prime. If social and economic history is to be of value in the formulation of a science of society, the historical data require to be subjected to a rigid analysis, which is different from the method most commonly applied to the study of history to-day.

There are in existence a number of methodological schemes for dealing with the facts of social history. There is the method, of which Troeltsch is the most famous exponent, by which history is regarded as the concrete representation of individual wholes. These historical individuals may be epochs or events, like the Renaissance or the Reformation; the point is that they can be apprehended only as a whole and not in terms of separate factors in interaction, and the historian's business is to arrive at their real essence by a process of intuition. This is an essentially artistic approach to history and it has certain advantages, in that it stresses the close interaction of all elements in a given social situation; but in so far as it implies that these elements are all of a piece and inseparable, cannot (that is to say) be studied by abstracting them and comparing their operation in other given social situations, it appears to be based on a misapprehension of the historical process.

It was in order to define and delimit the nature of abstraction in history that Weber propounded his method of "ideal types," of which Sombart has provided the best-known examples. Sombart, as is well known, claims to provide a theoretical basis for economic history by means of the concept which he calls the economic system. An economic system, to quote his own definition, is "a mode of satisfying and making provision for material wants, which can be comprehended as a unit and is animated by a definite spirit, regulated and organised according to a definite plan, and applying a definite technical knowledge."[1] To the different economic systems there correspond, he goes on to assert, different periods of history, in which those systems have been dominant. With the twin concepts of the economic system and the economic epoch, he proceeds to analyse the historical phenomenon of modern capitalism, as contrasted with pre-capitalism, the economic system which corresponds to the medieval epoch. In his analysis medieval pre-capitalism is a want-supplying, whereas modern capitalism is a profit-making, system. The spirit of the Middle Ages is one of tradition, whereas the spirit of modern capitalism is one of unboundedness and of what he calls "quantitative rationality" (meaning by rationality, of course, not reasonableness but the systematic adjustment of means to the single end of pecuniary profit—which may, or may not, be rational in the conventional sense of the term). Weber, it will be remembered, endeavoured to account for the rationality of the capitalist spirit by deriving it from religious values, which came to birth at the Reformation and were directly opposed to the values prevailing in the Middle Ages. Both Weber and

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[1] W. Sombart, "Economic Theory and Economic History," *Economic History Review* (1929), ii, p. 14.

Sombart lay great stress on the complete objectivisation undergone by the capitalistic system. When fully developed, it, and each separate enterprise within it, pursues its own way of life, moved by its own purpose and organic law, irrespective of the individual and his chaos of warring motives.

This method of approaching the study of social-economic history has distinct advantages. It is a real analysis and designed very successfully to bring out the distinctive features of each individual type, as compared with other actual or possible types of economic order. But the difficulty about ideal types is that those who use them are so apt to confound them with concrete historical realities. When Sombart asserts that to the economic system there corresponds an economic epoch, he is taking an enormous sideways step, without any apparent realisation that he has moved out of the path. A useful piece of methodological apparatus has become an historical individual ; the lexicon is imperceptibly transformed into the book, which was to be read by its aid. Hence the storm of protest with which historians have greeted his description of the Middle Ages as a period of pre-capitalism. To make it conform to his type he had to consider capital accumulation as mainly derived from urban rents and medieval trade as essentially handicraft in character. But in actual fact, as medieval historians at once pointed out, capital accumulations were largely derived not from rents but from trade, and trade itself, so far from being a mere exchange between townsman and peasant, was a large-scale international affair, animated by the most intense profit-making spirit and differing from modern international commerce only in its range. What Sombart has never grasped is that historians do not criticise him because he is a theorist, or object to his making use of the economic system as a methodological device. What they do object to is his assimilation of the economic system with the economic epoch. They claim that he has used theory not to interpret but to manipulate the facts of history. And insofar as his ideal type ceases to be ideal, his method is as unscientific as that of Troeltsch.

But it is not only because the abstraction of ideal types is always in danger of ceasing to be an abstraction that Weber's concentration on this method is inadequate. Even if the ideal type could be made and kept on the level of a perfect abstraction, it would still be neither the only nor possibly the most helpful one. There are many aspects in history which can be isolated for the purposes of scientific abstraction and comparison, and the task of a social historian is to discover and to subject to scientific treatment all the repeatable aspects of social life. His function is in the first instance one of analysis, he has to show the connections between the different elements in a phase of civilisation or an economic system, and thus to reveal its true nature. If he did this alone his work would be worth while. But the next stage in his business is to detach certain elements and, by comparing their operation in different surroundings and at different periods, to discover whether certain social phenomena are habitual. If he succeeds in doing this his evidence can be collated with the field-work of the anthropologist and of the descriptive sociologist (the field-worker in modern society) and the results expanded, wherever appropriate, by the apparatus of the deductive sciences, such as economic theory. Is it too much to hope that this may result in such an accumulation and classification of experience, with regard to those general problems to which we want answers, as may lead to the establishment of laws of social behaviour ? Such a question, of course, involves the often-discussed problem as to whether there *can* be anything in the nature of a social law in the scientific sense of the term, and I am aware that not only economists but also historians are sceptical as to the possibility. Naturally it depends on what is meant by a law. No one in his senses has ever pretended that the laws obtainable by the social scientist from the investigation of social reality can be as logically satisfactory as the formal laws of the deductive sciences, or even as those of the physical sciences. Both material and investigator are subject to disadvantages which do not exist in the case of the other sciences. But I conceive the whole trend of modern sociological thought to be in support of the view that it is possible to analyse social behaviour into a certain number of universal abstract relations; and if such laws are no more than rough approximations, that is already a great deal.

It should be observed that in so far as it combines sociological induction with deductive analysis the method which I am suggesting is not very different from that by which Marx approached the study of history. The Marxian treatment of history is valuable not as an interpretation of the facts, but as a method of dealing with them; it combines induction with deduction in a way that all social history must do if it is to be of any use. "No theory, no history." Moreover, if it be cleared of all the excrescences with which it has been covered by Marx himself, and still more by his followers, it does no more than state that all important institutions and activities can be explained in terms of other social activities (which is much what the functional method in modern anthropology assumes), and that all phenomena are social phenomena. From this it draws the conclusion that the correlations between these different social phenomena can be stated in terms of general laws, which allow the formation of reasonably valid interpretations of the past and expectations of the future. As a matter of pure methodology Marxism does not necessarily bind us to a materialist interpretation of history, nor even to a belief in the dialectical process. The difficulty is that most Marxist historians swallow whole the particular conclusions reached by Marx and refuse to allow his method to be developed and used for the discovery of new conclusions. The Marxists have not been content with asking the right questions, with realising (in Lord Acton's famous phrase) that the great sociologist, like the great historian, now " takes his meals in the kitchen." They have not infrequently used their position in the kitchen for the purpose of cooking the evidence.

So far I have endeavoured to suggest, first, that the progress of the social sciences depends upon a close integration of their work towards a common end, and secondly, that historical investigation, by making a wider use than it has hitherto done of abstraction and comparison, may play an important part in discovering to what extent (if any) " social things have habits." It is in this framework that I want to make my claim for the study of medieval history. I would urge that the Middle Ages is far from being the subject of mere antiquarian or romantic interest, which it is too often considered by those for whom the blessed date 1760 has taken the place of the blessed word Mesopotamia. Medieval like modern history can provide the economist with empirical data for checking his deductions and the historian with material to the elucidation of which the formal deductive methods of the economist can properly be applied. It is true that the use of medieval material is hampered by the scarcity of quantitative evidence; it is, as Professor Clapham would say, weak in " entities with a metrical aspect." But it is not so weak in them as economists are sometimes prone to imagine. For example it is perfectly feasible to study balance of trade problems in fifteenth-century England on the basis of the customs accounts, and there is adequate material for the compilation of that statistical history of prices, upon which an International Commission is even now at work. Moreover, apart altogether from these particular economic questions, medieval history is of great importance as a field for general sociological study and by no means irrelevant to an investigation of modern social problems.

The sociological study of questions of class, family, economic motive, the degree of rationality in the approach to economic affairs, or whatever else may be the object of investigation, naturally demands the whole of history for its field and medieval history can contribute only its share. But the period has certain general advantages. If an intelligent use of the comparative method be the heart and soul of sociological investigation, medieval history provides a peculiarly suitable basis for its application. It is so far removed from the present that neither contrasts nor similarities are blurred; each problem appears small and clear; it is

> like a little book
> Full of a thousand tales,
> Like the gilt page the good monks pen
> That is all smaller than a wren,
> Yet has high towers, meteors and men
> And suns and spouting whales,

and the advantage for the study of sociology is much the same as that possessed by anthropology. Again, medieval history comprises a long period of time, in which are included ages as distinct in outlook as that of the Merovingians at one end and the Italian Renaissance at another, and for this reason it is very well adapted for an intensive study of the operation of social change.

Medieval historians, moreover, have usually been more alive than modern historians to the theoretical aspects of their work. Recent discussions all bear upon fundamental problems, which just because they *are* fundamental, are of strictly contemporary interest. The problem of stages in social evolution, the problem of culture-contacts and their results, the problem of apparent breaches of continuity in the movement of civilisation, are all matters with which medieval historians have concerned themselves. But they are all lines of approach to an examination of the processes manifested in the phenomena of persistence, modifications and change, which is also the sociologist's business. Take, for instance, the fundamental question, which has occupied historians from the time of the humanists and is in the forefront of historical discussion to-day: what was the nature of the transition from ancient to medieval and from medieval to modern times? The old picture of this change was essentially cataclysmic. The Middle Ages was born in one revolution—the fall of the Roman Empire—and passed away in another—the Renaissance. During the intervening period everything was different, political organisation, economic system, the very psychology of man. But the most recent work on the subject has shown the problem of the transition in a new light, which excludes the view that anything remotely resembling a revolution took place at either end. The cataclysmic view of the passage from ancient to medieval society has been slowly breaking down for a generation, a breakdown immensely stimulated in our own time by the results of archæological investigation. Recent treatments of the later Roman Empire, of which Rostovtzeff's is the most suggestive, have shown us a world already moving rapidly towards a complete localisation of economic life; every estate striving to be self-sufficient and cultivated by *coloni* tied to the soil, every province trying to produce the wares which it wanted for itself, the great inter-provincial and foreign commerce of the early Empire petering down to a mere local exchange, supplemented by a trade in luxuries for the rich. In fact the Roman world under the later Empire was a feudal world. On the other hand, we are now learning that the Germans of the fifth century were far from primitive and that the picture of village communities of free and equal warriors is a myth. The remarkable work of Dopsch has shown us that social inequality and private landownership were old phenomena in their history, and that after the settlement they merely continued further along the way of social differentiation which led to the great estate and servile labour. He has, moreover, demonstrated very successfully that the actual destruction which took place in the act of conquest has been greatly exaggerated. In fine, Rome was less Roman, the barbarians at once less barbarous and less democratic than we once supposed and both were more feudal. Though the invasions gave a jolt to the social process, and doubtless heightened its tempo, they did not alter its direction. The final result would probably have been much the same if Rome had never fallen.

Similarly the change from medieval to modern times is now known to have been less relatively abrupt than it used to be represented. The economy of the central period of the Middle Ages (say, the twelfth and thirteenth centuries) did not, in fact, correspond as closely as was once supposed to the ideal type of a closed, want-supplying economy, unconcerned with the idea of profit. We begin to see that the immobility and self-sufficiency of medieval economic institutions have been greatly exaggerated. It is untrue to say of the medieval estate (to use Marx's famous phrase) that " the walls of the lord's stomach set a limit to his exploitation of his peasantry." The accumulation of landed property by individuals and communities went far beyond the needs of their own consumption. A manor was not a self-sufficing unit, but in most cases produced a surplus, which came from peasants' holdings as well as from the lord's demesne and which was sold. Many manors, indeed, were grouped as part of a single estate, which was considered as a whole and organised for profit. The fact that an international trade in agrarian produce (corn, wine and wool) existed from early times throws a very revealing light upon the situation. The self-sufficing manor is also a myth. Industry, too, was far from being a mere handicraft system, carried on by master craftsmen in democratic gilds. Into the picture there must also be fitted the great capitalistic industry of the Flemish and Italian cloth towns, which as far back as the twelfth century was based upon a wage system and an elaborate division of labour, and was run by big entrepreneurs for an international market. Nor was trade the handicraft exchange between town and country, which it has been represented by Bücher and Sombart. International trade and international finance, based upon an elaborate credit system, animated by the unbounded desire for gain and capitalistic to the tips of its fingers, was already in existence in thirteenth-century Italy.

Thus the capitalistic spirit was at work on all sides in the Middle Ages. Economically the Bardi and Spini of the thirteenth century belong to exactly the same species of phenomena as the Fuggers and Haugs of the sixteenth and the Barings and Rothschilds of the nineteenth century. A captain of industry like Boine Broke of Douai is of the same species as Henry Ford. The discovery of new routes, more particularly by the influx of silver and consequent price revolution which it brought with it, allowed the old spirit more scope. Puritanism, with its conception of a calling, the Renaissance, with its striving towards boundless ends, may have manured a soil in which it could flourish—or we may take the Marxian view and say that it manured a soil in which they could flourish. But the birth of capitalism does not belong to the sixteenth century.

I have insisted on this gradual view of the *modus operandi* of change, because it has important implications for the social historian. The continuity thus established opens wide possibilities for the use of the comparative method. The fundamental institutions and functions of modern times are found to be in existence far back in the Middle Ages. They have been present over a great part of history in somewhat different forms and under different disguises. Just because they are omnipresent, the differences which appear in different epochs can be compared and collated, in order to yield a better understanding of the essence of these functions and institutions. A very suggestive approach to the study of capitalism along these lines was made by Pirenne in a now famous article on *The Social Stages in the History of Capitalism*. In this, by a brilliant use of the comparative method, he sketched the evolution of capitalism from the eleventh century through five historical phases, analysing the similarities and differences which appear between phase and phase. Such an analysis brings us much nearer to a true understanding of the essence of capitalism, the forces which mould it and the forms of its transformation, than would have been possible on the old individualistic and cataclysmic interpretation. Just because Bardi, Fuggers and Rothschilds belong to the same species, they can be compared; just because there are differences between them, which must be due to the presence of variables, the historian can, by analysing these variables, play his part in elucidating the present.

I have in this long excursus endeavoured to show the extremely favourable opportunity offered by medieval history for a general inquiry into the nature of the social process. In common with the rest of the social sciences, it can make its contributions slowly and piecemeal, hoping that a scientific system will eventually emerge. But in addition to this patient and long-drawn-out inquiry there are also other ways in which the student of medieval history can be of assistance to the student of society. There are certain problems of modern life and politics which are demanding an immediate solution and with which economists and sociologists are trying to deal even before their science has provided them with infallible indications. Here, too, in problems of what may be called social technology as distinct from social science, medieval history can be of at least as much service as any other branch of history, or indeed as any other study. Let me take as an illustration two problems which are of contemporary importance and towards which I hold that an approach through the Middle Ages, by way of the comparative method, might have fruitful results. These problems are first, the problem of social control of the economic system; and secondly, the problem of the industrialisation of the East.

Let us consider the first of these questions. The typical characterisation of the Middle Ages may be accepted to this extent, that it was the period *par excellence* in which there was least rationality (in the narrow Sombartian sense of the term) in the approach to economic affairs. A certain control was exercised upon the economic system by an outside force, which may be described as subordination to a social end. From a sociological point of view, it is immaterial that the particular τέλος of the Middle Ages was religion, for that is merely one of many possible forms which a social end may assume. In the medieval view the economic system was not a self-contained sphere, obeying its own laws; it was part of a larger whole and must be subjected to the same purpose as that which governed the other departments of human life. The modern economic system of capitalism, on the other hand, is an objectivised system, obeying its own organic laws and dominated by no purpose other than its inherent purpose of profit-making.

This reading of the contrast between two civilisations, the one dominated to a great extent by non-economic motives, the other subdued to economic ends, the one obeying the mind of man, the other its own rule of life, raises problems which are of obvious contemporary interest. Clearly it is possible to exert a teleological control over the economic system, provided that you are agreed as to what your end is to be. The Middle Ages did it; we did it ourselves to a certain extent during the late war; and Soviet Russia is endeavouring to do it to-day. But we are still largely in the dark about the power of non-economic motives over the economic system, and the extent to which social control inevitably upsets the economic machine. It is of extreme interest to consider whether in the Middle Ages the teleological control was or was not operative; and, if it was operative, then what were the social conditions at the time which enabled it to be so. I cannot answer either of these questions, but an investigation of this type would, I suggest, be of more than academic interest. It would be strictly relevant to one of the fundamental problems of our age.

Again take my second problem, the problem of the industrialisation of Asia, of a society (that is to say) in which capitalism as an economic system has not arisen spontaneously. As it presents itself to Chinese thinkers this is again a problem of the relationship of the economic system to the social order. Can we, they constantly ask, industrialise China, but avoid the evil social results of industrialisation in Europe ? Or are the two inseparable aspects of the same thing ? In my view the historical method can be used as one line of approach towards a consideration of this problem; but it will involve a much more careful study of the origins of capitalism than they have ever yet received. The weakness of past investigations has lain in the fact that they have always contented themselves with asking why *has* capitalism arisen in Europe, not why *has not* capitalism arisen in Asia. Weber alone among the historians of capitalism perceived the bearing of the second question, and his posthumous text-book *General Economic History*, roughly put together as it is from students' lecture notes, shows what line his investigations would have taken had he lived. The problem why modern industrial capitalism has not risen spontaneously in Asia bristles with significance at every point. Why did not the great medieval trading societies of the Arabs, the Indians and the Chinese produce industrial capitalism as a stage following commercial capitalism, as was the case in the West ? Why did not the invention of Arabic numerals, to which Sombart assigns such an important part in the quantitative rationalisation of the economic enterprise, play the same part in the business of the people by whom the invention was made ? Is there a psychological explanation ? What are the variables in the situation ? By making use of the comparative method cannot the European Middle Ages and the modern East be made to shed a light upon each other and the problem of economic motive and social control be brought a stage nearer to its solution ?

To conclude, I have endeavoured in this lecture to assert a double claim for the study of history in a school of social sciences. I have urged that to be of any solid value social history must set before itself the general problems with which sociology is concerned and must investigate them, as far as possible, by the use of a genuinely scientific method of abstraction and comparison. I have suggested, moreover, that the study of the Middle Ages has its part to play in this process; and that for certain problems it has an advantage over other periods as a fruitful field of inquiry. If these claims be justified, the amount of pure research which still remains to be done is very great. An unlimited number of monographs is required. But the subjects to be investigated must be selected with an eye to the main problems; it must be recognised that they are separate pieces of a mosaic which has in the long run, when all the pieces are assembled, to form a design. Even before such a synthesis can be made, a consciousness of the theoretical problems involved and a perfected use of the comparative method in approaching them, will strengthen the vital connection which already exists, and should exist more fully, between social history and the other social sciences.

The Economic Theory Concerning Patents for Inventions[1]

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1. Patents for inventions comprise a special form of property, created by statute law. In the United Kingdom, for instance, patents " sealed with the seal of the Patent Office [which] shall have the same effect as if it were sealed with the Great Seal of the United Kingdom, and shall have effect throughout the United Kingdom and the Isle of Man " are granted under the Patents and Designs Acts, 1907 to 1932, every patent relating to one invention only and having a duration of sixteen years in the first instance; subject to fulfilment of the conditions laid down in the Acts.

2. The statutes creating patents in the various countries impose limitations on the exercise of the property rights which they comprise, but these are not the only peculiarities of this form of property. Despite the limitations, property rights in patents are more potent than is generally true of private property. The significance of private property in the economic system was enunciated long ago with great clarity by David Hume in his *Enquiry Concerning the Principles of Morals.* Property, he argued, has no purpose where there is abundance; it arises, and derives its significance, out of the scarcity of the objects which become appropriated, in a world in which people desire to benefit from their own work and sacrifice. Systems of Justice, he went on, protect property rights solely on account of their utility. Where the security of property is adequately assured, property owners generally see to it, that scarce " means " are directed to those uses which, within their knowledge and judgment, are most productive of what they want. Such is the diffusion of private property and of the desire to use it, that it is at any rate generally true that there is not a

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[1] Substantially a paper read before Section F of the British Association at Leicester, September 1933.

sufficient concentration of ownership of the supplies of a particular good, and of all the easily substitutable alternatives for it, to enable the owners to control the prices of the property they own. Neither the withholding, nor the disposal of the property of any one owner will in general affect appreciably the price of the commodity in question. Hitherto, this inability of property owners to control prices has been generally approved. If we except recent tendencies towards "planned monopolies," most proposals to interfere with property rights have been aimed in the past at prohibiting the concentration of supplies of particular commodities under a single ownership, in order to prevent the property owners from raising the price by withholding part of the supply.

3. It is a peculiarity of property rights in patents (and copyrights) that they do not arise out of the scarcity of the objects which become appropriated. They are not a *consequence* of scarcity. They are the deliberate creation of statute law; and, whereas in general the institution of private property makes for the preservation of scarce goods, tending (as we might somewhat loosely say) to lead us "to make the most of them," property rights in patents and copyright make possible the *creation* of a scarcity of the products appropriated which could not otherwise be maintained. Whereas we might expect that public action concerning private property would normally be directed at the prevention of the raising of prices, in these cases the object of the legislation is to confer the power of raising prices by enabling the creation of scarcity. The beneficiary is made the owner of the entire supply of a product for which there may be no easily obtainable substitute. It is the intention of the legislators that he shall be placed in a position to secure an income from the monopoly conferred upon him by restricting the supply in order to raise the price.

4. It may be assumed that the statutes creating these patent and copyright monopolies would not have been placed, or allowed to remain, upon the statute books in the absence of a widespread expectation of public advantage from their operation. Economists have of recent years found new difficulties in stating the effects of monopoly upon the magnitude of the national income, but it is nevertheless still broadly accepted that monopoly conditions tend to promote the diversion of the scarce means of production from a more to a less generally preferred utilisation. It is of interest, therefore, to review the expectations of those who approve of the patent system, to

consider the implications of those expectations, and the extent to which they have been realised. Are those expectations reasonable in themselves? Are the devices which have been adopted for their realisation appropriate? Has their operation resulted in objectionable consequences which may not have been foreseen?

5. As we have seen, the purpose of patents for inventions is, by giving an inventor the control for a definite period over the disposal of his invention, to make it easier for him to derive an income from it. With what objects? As soon as we enter into an examination of motive, we are, of course, venturing upon uncertain and debatable ground. It will, nevertheless, I think, be generally agreed that the ultimate aim is to encourage inventing. This is undoubtedly the expectation and hope of the vast majority of disinterested advocates of patents. The aim of all advocates, whether inventors themselves or not, is to make inventing pay better, and those at any rate who are not inventors hope for more inventions as a consequence. Even those supporters of the patent system who would describe their argument as purely ethical in character would probably agree that their ultimate concern is that inventors, *qua* inventors, should be enabled to survive. They may argue that their concern is to see that producers of inventions are not robbed of that which ought to be, even if it may not be in common law, their property; and yet their interest in inventors is very likely derived from a more fundamental belief that inventions are especially good in themselves, that the production and utilisation of inventions ought, therefore, to be encouraged, and that the way to attain that end is to extend the sphere of private property so as to increase the profitability of "inventing," and of the exploitation of inventions, as compared with other occupations. We are surely entitled, therefore, to attribute the existence of the patent law to a desire to stimulate invention.

6. In order to examine the effects of the patent system on invention it is, therefore, necessary first of all to ask what determines the amount of invention that takes place, and we must start with a working definition of "invention." To give it a wide enough meaning—much more comprehensive, by the way, than that to which patent law has come to be applied—invention is the devising of new ways of attaining given ends. We might widen the definition still further, by including the devising or suggesting of new ends themselves as inventions, but this would probably involve too great a departure from

ordinary usage. We may all agree that a new machine for making cigarettes is an invention but that a suggestion for the abandonment of cigarette-smoking in favour of something else is not. If we definite invention as the devising of new ways of attaining given ends it will be best to make the " given ends " as concrete as possible by excluding from the category of " invention " any change in consumers' taste.

7. This somewhat comprehensive definition of invention enables us to include, as we surely must, all new ways of attaining given ends, although many may not be immediately, if ever, adopted. A new device, employing a recently discovered and revolutionary scientific principle, may be mechanically excellent, and yet not capable of commercial exploitation. The time and extent of its adoption will depend upon price conditions. Changes in relative prices may lead to the abandonment of one much utilised process and the substitution of another, devised long since but never before adopted.

8. A useful distinction has been drawn by Professor Pigou between different types of change in economic conditions (and has been applied to inventions by Dr. J. R. Hicks), distinguishing those which are " autonomous," occurring spontaneously rather than in response to any environmental impulse, from those which are " induced " by environmental changes and owe their origin therefore to circumstance. Different writers have assessed very differently the relative importance, as regards their number, of inventions which fall into these two categories, and when we carry the analysis a step farther, and attempt a classification, within the second category, of the various circumstances which may induce invention, still more difference of emphasis is revealed in the views of the various authorities.

9. Spontaneous or " autonomous " inventions include those which arise from the existence of what Professor Taussig calls the " instinct of contrivance." So far as these are concerned, necessity is not the mother of invention; the act of inventing rather is a necessity in itself. The inventor cannot help it. Just as some people, who may never be recognised as poets, continue to pour out volumes of verse, so others may spend their time or part of it in devising contrivances or inventions. Sir Josiah Stamp in his stimulating essay on *Invention* (Watt Anniversary Lecture, Greenock, 1928, reprinted in *Some Economic Factors in Modern Life*) inclines to the view that the flow of invention is largely explained in this way. ' The

inventor,' he says, 'is still *sui generis*, and emerges from the ranks of engineers, physicists, and chemists, not indeed as a " sport," but as a special product, which is touched by no " economic spring." The sense of curiosity and the idea of fame play a greater part than the economic reward.' Not all of the inventors, however, whose output is involuntary, are impervious to prospects of gain. Like artists, some may turn their talent to profitable use. The amount and rate of flow may be invariable, but its direction may be influenced by inducements of one sort or another. Inventing may be spontaneous, but the nature or form that it takes may be controlled by circumstance. It will probably be generally agreed that the number of " involuntary inventors " whose output is completely unaffected by economic conditions is at least as small as that of artists who work without regard to the saleability of their output.

More definitely in the category of " spontaneous " inventions are those which are made by accident, for the most part no doubt as the chance by-product of activity directed to some other purpose. Every scientific worker knows how frequently an enquiry leads to discoveries which answer questions very different from those which prompted the investigation. Undoubtedly, in the field of invention, contrivances are accidentally hit upon in the same way; but in all probability, the majority of these "chance" inventions are also indirectly " induced "—one stage removed, as it were—for the greater part of the activity out of which they arise is influenced by circumstance. Of a somewhat similar character, again, are the inventions of " amateurs " who, when inspecting the specialised technique of a particular field of production, being prompted by curiosity rather than hope of gain, are enabled by their unusual possession of experience of some other technique to suggest improvements and new devices which fail to occur to the minds of practitioners themselves. The timing, at least, of such inventions is undoubtedly largely fortuitous.

10. Induced inventions owe at any rate their nature, if not their volume, to the circumstances of time and place. One very potent cause affecting the amount of inventions is clearly the rate of growth of scientific knowledge. The greater the volume of new scientific discoveries, the more rapid will become the rate of application of these discoveries by inventors to purposes of production. Invention does not, of course, wait upon the completion of scientific discovery. As William Edward Hearn wrote seventy years ago, in what is surely still

the best theoretical discussion " Of the Circumstances which Determine the Extent of Invention " (in his *Plutology*, ch. xi): " The knowledge that is imperfect for the purposes of speculation is often a sufficient guide for the daily business of life." " Even at the present day," he adds, " many processes of our most successful arts have not yet received a scientific explanation. . . . But in all empirical arts, the limit of improvement is soon reached."

11. A second influence on the nature, if not on the volume, of new invention is specialisation and the division of labour. The specialisation which has been made possible by the great increase in the number of scientific workers has in itself tended to increase the rate of scientific discovery. Similarly, the division of labour in production has exerted an influence on invention. Adam Smith made the point perhaps too forcibly (*Wealth of Nations*, Book I, ch. i) when he observed that " the invention of all machines by which labour is so much facilitated and abridged, seems to have been originally owing to the division of labour." W. E. Hearn and, following him, W. S. Jevons (*Principles of Economics*) both criticised the extravagance of Smith's language, calling attention to the number of important inventions which have emanated from unexpected quarters. Yet they did not deny the obvious truth that specialisation in product and the division of labour make possible the detailed consideration of technological processes, and that inventions of new processes do arise out of such continuous and intimate consideration of detail. Whether there is in consequence a net addition to the *volume* of invention, as distinct from a change in its nature, is another matter.

12. It is true that the growing mechanisation of industry withdraws ever more of the active and trained minds from actual machine operation and may in that way reduce the number of inventions that would otherwise be made in that field, but it would be a very incomplete account of the effects of the division of labour on invention that stopped there. Specialisation has, of course, released the more able and ingenious and mentally alert workers from routine tasks for the performance of just such special tasks as inventing. It has made possible the career of professional " inventor." It has moreover resulted in the increased wealth of communities, which has made possible the increase of knowledge by the endowment of research, and the spread of knowledge and the training of ability by the endowment of education. These in

turn have increased on the one hand the field for invention, and on the other hand, the number of active inventors.

13. Increasing wealth, the division of labour, the progress of science, then, are clearly circumstances which induce in these various ways the invention of new processes and devices. It remains to add another circumstance, which provides the incentive for the making of particular inventions, and that is the existence of favourable price conditions. Dispute there may well be as to the effect of price changes, and of the consequent emergence of new opportunities for profit and new probabilities of loss, on the *volume* of invention that takes place as a whole in a given period, but as to the important *directive* influence of price conditions upon by far the greater part of inventive effort there can be no doubt at all. Hearn wrote: "The principal circumstance which affects the progress of inventions is the strength of the motive for their use. When the demand is sufficiently strong, the supply generally overtakes it. . . ." The price conditions which induce invention in particular fields are those which offer a special return to inventors in those fields. The inventions may be induced either by the possibility of quite exceptional profits to those who can cut costs still further during times of flourishing trade, when an industry is already profitable, or by the imminence of certain loss to entrepreneurs who have fixed investments in industries which are depressed, and whose only hope is an innovation which will reduce expenses below receipts. During the post-war years, for instance, inventions have been induced by price conditions in both the coal industry and the rubber industry on the one hand, and in the motor-car and radio industries on the other.

14. Hitherto, the interest of economists in the relation between inventions and industrial fluctuations has been concentrated mainly on the part played by inventions in the causation of fluctuations. (Cf., e.g. Mr. D. H. Robertson's *Study of Industrial Fluctuations*, and Professor Pigou's *Industrial Fluctuations*.) The problem of the reverse effects of business fluctuations on the flow of inventions is a no less fascinating subject of study, about which a number of unargued and contradictory statements have been made. It is important to distinguish between the making of an invention and its adoption. Sir Josiah Stamp, in the paper already referred to, says: "On the whole I incline to the view that the periods of rapid and important invention tend to be periods of larger differential

profits." The view is not supported in the paper by evidence or argument. Professor Pigou in his *Industrial Fluctuations* (ch. iv, p. 43) is concerned mainly to refute the proposition that fluctuations in general business activity may be initiated by variations in the rate at which ordinary minor inventions and improvements are made. He argues that even in the case of major inventions it is the decision to exploit inventions rather than the making of the inventions itself that is the major cause of disturbance, the time and intensity of exploitation being largely determined by the state of business confidence. " There is," he says, " . . . a strong probability that invention as a whole will fluctuate very much less than invention in any given representative occupation,"—i.e. he implies that there is a transfer of inventive activity from one industry to another, expansions in one field being compensated more or less by declines in invention elsewhere; and he states definitely that " there is evidence that in slack periods technical devices and improvements accumulate in the sphere of knowledge, but are not exploited till times improve." The nature of the evidence is not stated. It presumably relates to the statistics concerning the rate of exploitation rather than of invention itself. Such an accumulation of inventions during depressions is compatible with increasing, stationary or declining absolute rates of invention, being purely relative to the rate of exploitation, which one might reasonably expect to decline when business confidence is at a low ebb. It is of interest to notice, however, that elsewhere in the same study (p. 12) Professor Pigou asserts that "in periods of depression the amount of *intelligence* put into production is, in general, larger, partly because relatively inefficient business men are compelled to sell out to others, but mainly because those who remain in business 'are put on their mettle, and exert themselves to the utmost to invent improved methods, and to avail themselves of the improvements made by others.'" This would imply an increased rate of both invention *and* exploitation during depressions, at least on the part of those who remain in business.[1]

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[1] I cannot trace any attempt hitherto at statistical investigation of the relationship between disturbances in industrial activity and variations in the rate of invention. Professor Pigou, having in mind, of course, the reverse connection, considers that " it is not in fact possible to demonstrate a close statistical correlation between the making of industrial inventions and *neighbouring* disturbances in general industrial activity." That may well prove to be true. I am myself much disposed after somewhat close and prolonged study to hope that the detailed records of patent applications available over a long period in this and other countries can be made to throw light on this and the other related questions. The returns are available separately for different

15. In the meantime certain conclusions may be hazarded concerning induced inventions; firstly, that every price change, by creating cost difficulties in certain fields and opportunities for profit-making in others, provides a double stimulus to invention, and secondly that the larger the price change the greater will be the stimulus to invent. Thirdly, during periods of disturbance of the general level of prices, a more general stimulus to inventions and to the exploitation of existing inventions may be expected, for we know that individual price relationships are disturbed whenever, for monetary reasons, the general price level shifts. Fourthly, any government measures designed especially to reward inventors, whether by subsidisation or by the patent system, i.e. the grant of monopoly rights over the utilisation of their inventions, may be expected, because of their influence upon price conditions, to affect the flow of inventions. It is with the patent system that we are here primarily concerned. Despite the publication of a large body of specialist literature, in the nineteenth century in particular, on the merits of patent systems, they have received scant attention by economists in the standard treatises.

16. The patent system may, on the one hand, be expected to affect the making of inventions in two ways. The first is to divert inventive activity into those fields in which the monopoly grant will be expected to prove most remunerative. It may, secondly, affect the total amount of inventive activity. The patent system may, on the other hand, exercise another effect of perhaps equal importance. It may influence the ability or willingness of entrepreneurs to make use of new inventions after they have been made.

17. It will be convenient to consider first the effect of the patent system on the amount of inventive activity. Considerable difference of opinion on this aspect of the question is revealed by the scant references made by economists who go out of their way to praise the patent system. On the one hand there is the view, perhaps best represented in our own time by

categories of industry (in this country, for instance, over a long period, there are 146 categories), those concerning provisional applications provide excellent evidence of the date at which inventions are made, and the subsequent history of the patents can be used for a study of the timing of the actual exploitation. In particular instances, the influence of adversity as well as of prosperity within an industry upon the display of inventiveness can easily be traced beyond reasonable doubt. With due care it may be possible also to draw conclusions with regard to the relation between the display of inventiveness and industrial fluctuations in general. The work is progressing, but further discussion must be reserved for another occasion.

Professor J. B. Clark in his *Essentials of Economic Theory* (ch. xxi), that without the patent system there would be very little inventing, and very little adoption of inventions by producers, at all. " If an invention became public property the moment that it was made," he says, " there would be small profit accruing to any one from the use of it and smaller ones from making it. . . . The system which gave a man no control over the use of his inventions would result in a rivalry in waiting for others rather than an effort to distance others in originating improvements. This fact affords a justification for one variety of monopoly. . . . Patents stimulate improvement, and the general practice of the nations indicates their recognition of this fact." For the expression of a very different view we may turn to Professor F. W. Taussig (*Inventors and Money-Makers*), who throws doubt upon what he designates as the view of the older utilitarians, that " men contrived simply because this was conducive to gain, and would not contrive unless prompted by the experience and prospect of gain," and suggests instead that invention may arise mainly as a spontaneous manifestation of a human " instinct of contrivance." If this is so, " we may be led to conclude," he adds, although it is not his conclusion, " that the patent system, for example, is a huge mistake." Later, he observes that " the defenders of patent legislation often descant on the public benefit from inventions as if there were a special moral desert on the part of the projectors and patentees. They put their case badly. What deserves emphasis is the influence of calculated profit in directing the inventor's activity, spontaneous though it be, into channels of general usefulness." The patent system is commended because it directs rather than increases inventing activity. Professor Pigou puts the same view still more definitely (*Economics of Welfare*, 2nd edition, Part II, chapter viii): " The patent laws aim, in effect, at bringing marginal private net product and marginal social net product more closely together. By offering the prospect of reward for certain types of invention they do not, indeed, appreciably stimulate inventive activity, which is, for the most part, spontaneous, but they do direct it into channels of general usefulness." The only supporting evidence is a reference back to Professor Taussig.

18. The economists of the early nineteenth century who considered the question were as definite as Professor J. B. Clark that inventions would practically cease if the patent system were abandoned. Jeremy Bentham was in no doubt at

all (*Rationale of Reward*): " With respect to a great number of inventions in the arts, an exclusive privilege is absolutely necessary in order that what is sown may be reaped. . . . He who has no hope that he shall reap will not take the trouble to sow." John Stuart Mill's argument was similar. (*Principles of Political Economy*, Book V., ch. x, s. 4.) As Professor Taussig said, the utilitarians assumed that the patent system was responsible for the greater part of inventing activity. The question which they one and all failed to ask themselves, however, is what these people would otherwise be doing if the patent system were not diverting their attention by the offer of monopolistic profits to the task of inventing. By what system of economic calculus were they enabled to conclude so definitely that the gain of any inventions that they might make would not be offset by the loss of other output ? By no stretch of the imagination can the inventing class be assumed to be otherwise unemployable. Other product which is foregone when scarce factors are diverted in this way completely escaped their attention.

In the view of Bentham, the patent system " produces an infinite effect, and it costs nothing." Jean Baptiste Say, although subsequently more critical, made a similar mistake in his *Traité* (Prinsep translation, Book I, ch. xvii): " Privileges of this kind no one can reasonably object to; for they neither interfere with, nor cramp any branch of industry, previously in operation." The withdrawal from them of scarce resources is ignored. To John Stuart Mill, again, the only public loss was merely the postponing of a part of the increased cheapness which the public owe to the inventor.

Manufacturers, although some of them were inventors themselves, who gave evidence advocating the abolition of the patent system before a Select Committee of the House of Lords in 1851, were no doubt enabled by self-interest to perceive the loss more clearly. I. K. Brunel, for instance, believed that because of the patent laws people spent their time trying to invent, who would do better for themselves at other things. In particular, he maintained that workers wasted their time and ruined themselves, trying to think out patentable inventions, when development would be much quicker if they were not thus distracted from making improvements and refinements of a non-patentable kind. In the 'sixties James Stirling, famous in another connection for his rebuke of John Stuart Mill at his capitulation to a sentimentally " soft school of political economy," emphasised the dangers of an over-stimulation of inventions by the patent system. Yet at the beginning of this century Professor J. B. Clark was still writing: " If the patented article is something which society without a patent system would not have secured at all—the inventor's monopoly hurts nobody. . . . His gains consist in something which no one loses, even while he enjoys them." No inkling here that the patent inducement to invent diverts scarce human effort from other production, and that the subsequent exploitation of patents again interferes with the disposition of scarce factors which would obtain under competitive conditions.

19. If the views of Professors Taussig and Pigou, that the *amount* of inventive activity is in the main unaffected by the inducement offered by patent monopolies, come to be substantiated, the traditional case for the system will have been destroyed without further need for criticism; but it would surely be unreasonable to accept their view without strong supporting evidence. It seems unquestionable not only that a very considerable volume of inventive activity must definitely be induced by price conditions, but also that that activity is diverted by price movements from other types of endeavour as well as from other fields of invention. Entrepreneurs faced with new difficulties or with new opportunities will divert not only their own attention, but that of every technician who can be spared, from the business of routine production to that of urgent innovation. They will not rely exclusively upon those types of professional inventors whose autonomous output pours out in a stream of unvarying size, and some of whom may be prepared, in return for the inducements which the entrepreneurs can offer, to transfer their spontaneous activity to their service. It cannot be assumed that all who are capable of innovation spend their whole lives in inventing. Many of them are also able administrators and production controllers; some in the past have been clergymen and barbers, and in our own time there is a steady flow of technicians from the research laboratories of pure science into those of industrial invention and out again. Price changes, particularly if prices appear likely to take a new " set," may therefore be expected to lead to an increase of invention and a decline in other activity.

The patent system makes possible this type of price movement. It enables those who have the monopoly of the right to use a patented invention to raise the price of using it for the whole term of the patent, within the limits fixed by the elasticity of demand, and in that way to derive a larger profit from the invention than they could otherwise obtain. The effect must surely be to induce a considerable volume of activity to be diverted from other spheres to the attempt to make inventions of a patentable type.

20. It will be convenient at this stage to consider both kinds of diversion together, i.e. from other kinds of activity into invention, and from one kind of inventive activity to attempts to make such patentable inventions as will, in the expectation of the inventor or of those directing his efforts, produce the greatest possible remuneration under a régime of monopoly. It will be recollected that Professors Taussig and Pigou declare the merit of the patent system to be the inducement it offers for the production of inventions of greater "general usefulness" than would otherwise be made.

It will be clear first of all that there is one class of inventions, on the making of which the patent system can exert no effect at all, namely those arising spontaneously, whether by accident or as manifestations of an "instinct of contrivance," in persons whose inventing is uninfluenced by all economic stimulus. It is hardly likely that this class is very important in volume or in kind.

The making of all other categories of patentable inventions may, however, be induced by the patent system. It does not follow, of course, that they will necessarily all be made in response to this inducement, for in the absence of patents a sufficient price incentive might be present, in open market conditions, to direct inventive activity to the same field; but in so far as the inducement is furnished only by the expectation of a patent monopoly, a diversion of resources takes place and other production is foregone. What grounds are there for concluding that the output induced by this type of monopoly has any greater claim to be regarded as "generally useful" than that which would have been induced in its absence by the price conditions of the open market? I suggest that such a conclusion runs counter to all general presumptions concerning the disposition of scarce productive resources in a régime of monopolistic control as contrasted with open competition. The nearer that market conditions approximate to pure competition, the less likely does it become that any *entrepreneur* or property owner will find it possible to influence prices by withholding supplies, and the more likely in consequence does it become that all resources, being put to the uses which maximise the incomes of their owners, will yield their greatest aggregate product. In perfect competition all production will take place at lowest cost per unit produced. How can it be argued that any departure from such a condition, induced by the grant of monopoly power to raise prices and increase a sectional income by restricting output, will achieve greater "general usefulness"?

The only conceivable line for such an argument to take would seem to be that *ultimately* the inventions of a patentable type which will be made in response to the grant of a temporary monopoly will possess a sufficiently greater general usefulness than would result from the other inventions or other output immediately foregone, to outweigh the immediate loss. There surely exists no scientific reason for making any such claim for *patentable* inventions in general, as compared with alternative output. It is conceivable that exceptional cases may arise, in which a new mechanism becomes socially desirable for a specific and very special purpose, and that prolonged research and experiment seem inevitable for its perfection, while no remuneration is likely to be forthcoming in the interim from models which are not wholly successful. In such cases, special inducements might be necessary to secure the end in view. Thus, for example, if a flying machine were needed capable of non-stop flights round the Equator, and machines with smaller ranges were of no utility, entrepreneurs might not be forthcoming and there might be a case for a special fund to finance the making of the invention. A patent system applicable to inventions in general clearly cannot be justified, however, by exceptional circumstances of this kind. Economics, in short, has not yet evolved any apparatus of analysis which would enable us to pronounce upon the relative productivity of this particular infant industry—the production of inventions; nor does it provide any criteria for the approval of this method of special encouragement.

21. The contention still remains for consideration that the patent system is necessary in order to secure the exploitation, if not the production of inventions. The main argument is that entrepreneurs will be reluctant to invest in plant which others may also acquire for purposes of competition. It need not detain us for long. It cannot be assumed that patentable inventions in general necessitate new investment in such large units that fears of duplication will provide a frequent deterrent to entrepreneurs. It is still exceptional for a single specialised productive unit to be sufficient to meet the bulk of the demand

for a product. Neither can it be assumed that inventors would cease to be employed if entrepreneurs lost the monopoly over the use of their inventions. Businesses employ them to-day for the production of non-patentable inventions, and they do not do so merely for the profit which priority secures. In active competition, the condition in which new devices are most promptly imitated, no business can afford to lag behind its competitors. The reputation of a firm depends upon its ability to keep ahead, to be first in the market with new improvements in its products and new reductions in their prices.

A hundred years ago it was also argued as a merit of the patent system that it provided an inducement to inventors to make public the nature of their inventions so that they would eventually be generally available for wider exploitation. When businesses were small, and processes might remain one-man or family affairs, secrecy and monopoly might indeed persist longer in open competition than under the patent system, just as it is reputed to do still within the Maskelyne family of conjurers. But the conditions of industrial production have changed in this respect. With large-scale manufacture, few valuable processes can now be conducted on so small a scale that prolonged secrecy is feasible. Possibly—it is a question requiring intimate technical experience—there may exist chemical processes in which the nature of the product defies analysis and reconstruction of the method of manufacture, and in which the nature and proportions of the ingredients can effectively be maintained as the secret of a few people; but such cases, if they indeed exist outside the pages of detective fiction and sensational literature, must surely be exceptional, and unlikely to be eradicated by the inducements of temporary patent protection.

22. If the theoretical basis of the patent system is indeed as uncertain as this analysis suggests, the actual provisions of patent legislation cannot but be arbitrary. It is impossible to share Jeremy Bentham's enthusiasm. To him " an exclusive privilege is of all rewards the best proportioned, the most natural, and the least burthensome." . . . " [A patent] unites every property which can be wished for in a reward. It is variable, equable, commensurable, characteristic, exemplary, frugal, promotive of perseverance, subservient to compensation, popular, and revocable." I propose to refer to a number of features of the patent system as it exists which are of particular relevance to the preceding discussion.

23. There is first the question of the types of innovation which are covered by the patent law. A very great deal of invention goes on outside its range, without any inducement beyond that provided by the operations of the open market. One need only point to the so-called fashion trades, in which the rate of invention reaches probably its highest point, and to the non-patentable refinements and improvements every day being added to all kinds of industrial product. In the last three hundred years there has been an enormous amount of litigation in this country concerning the nature of " a new manufacture." To the student of economics it makes instructive reading. " Biological inventions "—innovations in plant-breeding for the production of special types, for instance, which are of undoubted economic significance in the agricultural and pastoral industries—are excluded. They may be freely adopted by competitors. Yet they continue to be made. Medical practitioners, partly no doubt on account of traditional altruism and partly as the result of the lead, if not the drive, of their professional associations, make very little use of the patent laws; and yet the work of medical invention goes on. The whole field of scientific discovery lies outside the scope of the system, although inventors and manufacturers may owe the fortunes they have made from patented products in the main to the workers in pure science whose discoveries they have applied. The task of distinguishing a scientific discovery from its practical application, which may be patentable—as for example in the field of wireless—is often baffling to the most subtle lawyer. Associations of interested and discontented scientists do not fail to press their claims for inclusion. There are the notorious Ruffini proposals, for instance, for the grant of monopolies to scientists covering their published discoveries. Similarly, in the field of minor industrial inventions, there is strong pressure for an extension of the patent system, to supplement the registration of designs by a short-period patent protection of particular arrangements of mechanism, on the lines of the German Gebrauchsmuster. How can it be shown that the " patentable " class of innovations possesses so much greater usefulness than all these others that it should be specially encouraged by monopoly ?

24. Secondly, there is the system of reward itself. It operates in favour of only one or one group of the many participants in the progress of an invention from the birth of the scientific discovery to the emergence of the patent monopoly. The

scientific discovery itself may be the culmination of the research and of the tentative hypotheses of many scientific workers: the possibility of applying it in a particular device may occur almost simultaneously to large numbers of industrial technicians; priority in the formulation of the provisional patent application may be a matter of days or of minutes. But one application alone can satisfy the requirement of this man-made law that the patent shall be granted to " the first inventor," who receives a monopoly of the use of it for sixteen years, in this country, with the possibility of an extension for another ten. The grant of a monopoly renders almost nugatory the labours of all the rest, for any refinements they may subsequently invent in this type of device will, if patented, be much reduced in value by the requirement that acknowledgment shall be made, in the patent specification, of the prior " invention." Lotteries in open competition there may well be; but the lottery of the patent system awards but one prize, and that a monopoly, while those who subscribe most of its value may be precluded from qualifying for the prize.

The existence of a monopoly in fact operates to divert the attention of inventors from what may well be the most fruitful field for further innovation. In the case of inventions which cannot be patented, a particularly useful device at once attracts the attention of other specialists who seek, maybe competitively, to refine and improve it and to adapt it to the widest possible use. The blocking effects of patent monopolies check these surely beneficial tendencies; competitors, instead of helping to improve the best, are compelled in self-preservation to apply themselves to the devising of alternatives which, though possibly inferior, will circumvent the patent. It is a particular case, but one which is very widespread, of the maldistribution of resources which is consequent upon the existence of monopoly.

The term of the patent grant must inevitably be arbitrarily determined, even if each invention were separately considered. A fixed period of years for all and sundry expediently avoids countless difficulties, the range of which may be gauged from the efforts of the courts to determine, in the case of applications for extensions, the " nature and merits " of an invention; in order to decide whether the patentee has been " inadequately remunerated " and the period, if any, for which an extension shall be granted. Economists will well appreciate why the Royal Commission of 1862, which included Lord Overstone, was strongly opposed to any extensions whatever. Yet if there were a parallel provision, that any person interested might apply at any time during the life of a patent for its revocation on the grounds that the patentee was already more than adequately remunerated, some interesting legislation would certainly ensue, and the decisions of the Courts, however lacking in principle, might well be preferable to the existing fixed minimum term.

25. Special interest attaches to the provisions which have been gradually inserted in the patent laws during the past hundred years with the object of mitigating " abuses " of the system, meaning thereby such use of the monopoly power as appeared obviously in conflict with the general interest. From the 1840's, side by side with the movement for the simplification of the patent law, there continued for a generation a strong agitation for the abolition of the whole system. It had the support of *The Times* and of *The Economist*. The strong Royal Commission of 1862-4, though precluded by its terms of reference from doing more than recommend amendments, was clearly opposed to the whole system. Professor Thorold Rogers read two papers against both patents and copyrights before the British Association in 1864 and 1865; while Members of Parliament and manufacturers carried on a continuous propaganda. The movement was not confined to England; in the late 'sixties a number of economists in France, including M. T. N. Benard and Michel Chevalier, wrote against patents; in Germany, Bismarck attacked the system in 1868 in the North German Federal Parliament; in Holland, the patent law was repealed in 1869. In England, however, the Act of 1852 gave such an impetus to the patenting of inventions that in the 'seventies the attempt at abolition was gradually abandoned in favour of the more easily practicable policy of mitigating its most obvious evils. The official examiner system of search for anticipations of new claims was introduced and gradually extended; the cost of securing patents was reduced, for the benefit of poor inventors, and payments reduced in the early years so that inventors should not be compelled to allow their protection to lapse before they had had a reasonable time in which to arrange for the exploitation of their invention. International conventions were arranged to secure more reciprocity in the treatment of foreign inventions, and to reduce in that way the competition to which manufacturers under licence were otherwise liable from foreign producers

outside the jurisdiction of the laws of this country. I propose in the remainder of this paper to confine myself to two only of the modifications which have been introduced into the patent legislation of this country, viz. the sections governing the grant of " compulsory licences " and the more recently introduced " licences of right."

26. Provision has been made for fifty years now for the grant of compulsory licences in the event of certain allegations, which could be made by any person interested, being found by the competent tribunal to be true. From the first, one of the grounds has been that the patent is not being worked in the United Kingdom, and that satisfactory explanations of the failure to do so are not forthcoming. This manifestation of protection is of interest, particularly in relation to the question of the effect of such provisions on the amount of output which the patentee will find it profitable to produce, but it need not detain us here. Another ground has from the first been that the demand for the patented article in the United Kingdom is not being met to an adequate extent and on reasonable terms. The Board of Trade originally, then subsequently the Judicial Committee of the Privy Council, and now the Comptroller of the Patent Office (subject to appeal to the Courts) have in consequence had thrown upon them the duty of deciding, in cases in which the law confers a monopoly upon an inventor in order that by restricting the use of his invention he may derive an income, whether the output is " adequate " and the terms " reasonable." The competitive output being ruled out, what monopoly output and price can be more " reasonable " than that which pays the monopolist best ? The handling of this problem by the appointed tribunals once more makes instructive reading for the student of economics: but the responsibility of the tribunal does not rest there. It is called upon, in addition, to settle the terms upon which compulsory licences are granted. The Royal Commission of 1862 had recommended against compulsory licences precisely because it regarded the practical difficulties of fixing the proper terms as insuperable. " On this question of price " they urged " individual opinions must be expected to vary widely." Arbitration would not be satisfactory " where neither precedent nor custom, nor fixed rule of any kind could be appealed to on either side." The Patents and Designs Acts to-day make an amusing endeavour to help out the unfortunate assessor by directing his attention to certain

guiding considerations. The first two are worthy of notice here:

> [Patents and Designs Act, 1907 (as amended),
> Section 24—(1) (*b*)]
>
> "(i) he shall, on the one hand, endeavour to secure the widest possible user of the invention in the United Kingdom consistent with the patentee deriving a reasonable advantage from his patent rights;
>
> "(ii) he shall, on the other hand, endeavour to secure to the patentee the maximum advantage consistent with the invention being worked by the licensee at a reasonable profit in the United Kingdom."

Possibly those responsible for this formula might be satisfied if the assessor contrived to induce both the full competitive output and the maximum monopoly profit at the same time.

It is enlightening to examine the extent to which since 1919 the Comptroller has attempted to interpret these instructions. By the end of 1931, out of less than fifty applications, many of which were subsequently withdrawn, nine grants were actually made. Three were however discharged on appeal, and in the case of the remaining six it appears that it was not necessary for the Comptroller to fix terms.

The same duty of fixing terms, failing agreement between the parties, falls upon the Comptroller in the case of Licences of Right. In the same period, 7,533 patents were endorsed, but in only seventeen cases was an application made for the settlement of terms. At the end of 1931, three of these applications had been withdrawn, one was suspended by request of the parties, and thirteen were still pending. In no case, therefore, had the Comptroller been persuaded to attempt the feat of following the instructions of the Act.

27. Licences of Right furnish us with an economic curiosity. The 1919 Act, presumably with the object of inducing monopolist patentees not to restrict so narrowly the supply of the invention during the life of the patent, offers the remission of half the fees subsequently payable to all patentees who request that their patent be endorsed "Licences of Right," the effect being that any person may thereafter be entitled as of right to a licence to use the invention upon terms to be agreed or settled by the Comptroller. The large number of endorsements—7,533 to the end of 1931—is striking, although of course a small percentage of the total number of patents in force during

the period (about 20,000 new complete specifications being added each year). The fact that in all cases the licence fee has been fixed by agreement without recourse to arbitration by the Comptroller would suggest that the patentee secures a royalty not far different from that which he believes will adjust the total output to the amount which maximises his monopoly profit.

If we were to make the assumption that the adjustment of volume of output to given price conditions takes place promptly, and that different firms have broadly the same production costs, the position would then be that the volume of output would remain more or less the same as that which would emerge under the ordinary patent system, while the patent office would have forfeited half its revenue to little good purpose, so far as the general public is concerned. We cannot, however, assume either that production costs of different firms are identical, or that a sole licensee will rapidly expand his output and sales to the point of maximum net revenue. It therefore appears very probable that the Licence of Right system, by enabling any producer to try his hand at producing the patented article, facilitates the operation of competitive forces in concentrating output in the firms which have lowest costs, and encourages the rapid spreading of production over a number of producers, so that the aggregate output is in fact increased more rapidly to the point of maximum monopoly profit (if the patentee fixes his terms to his best advantage) than would otherwise be likely (if it does not in fact exceed that amount for a time, to the loss of certain licensees). This device almost certainly serves to increase output, for without it the monopolist would probably not as rapidly decide to grant as many licences to the producers whose costs are lowest.

Without, therefore, injuring the monopolist's interest, so long as licence terms continue to remain at the point he himself selects, the licence of right system tends to correct one of the *practical* objections to the patent system, i.e. the slowness of the expansion of the output of patented articles. If, therefore, it could be reasonably assumed that the Comptroller would continue successfully to evade the alarming task of fixing terms, there would be much to be said in favour of modifying the patent system so that licences of right became the normal practice. In the case of copyright, in which the device was first applied, the problem of terms could be settled—if crudely—by fixing a royalty of so much per cent. of the price of the book or gramophone record or piano-roll as the case might be. So simple a solution is hardly applicable to inventions, and if disputes between patentees and licensees became frequent some other rough-and-ready rule would need to be devised.

28. Expedients such as licences of right, nevertheless, cannot repair the lack of theoretical principle behind the whole patent system. They can only serve to confine the evils of monopoly within the limits contemplated by the legislators; and, as I have endeavoured to show, the science of economics as it stands to-day furnishes no basis of justification for this enormous experiment in the encouragement of a particular activity by enabling monopolistic price control.

There is to-day widespread alarm at that increasingly rapid rate of obsolescence of industrial equipment, which is the reverse aspect of the quickening of technical progress. Everywhere we encounter the protests of owners of specialised plant and of specialised workers at the changes which convert property and specialised skill into "surplus capacity." In so far as the new enterprises compete for their resources, capital and labour, in open competition with existing businesses, economists have strong grounds for the presumption that the gains from their success will outweigh the losses. If, however, innovation is especially encouraged, to the loss of other production, by monopoly price conditions, is it not conceivable that there may be relatively "too much invention of the wrong kind," and, in consequence, "too much" obsolescence and displacement of specialised ability? Can it be that the patent system is in part responsible for our present economic troubles?

A Reconsideration of the Theory of Value

By J. R. Hicks and R. G. D. Allen

Part I

By J. R. Hicks

The pure theory of exchange value, after a period of intensive study by economists of the generation of Jevons and Marshall, has received comparatively little attention from their successors in the twentieth century. Apart from some very interesting inquiries into what may be called the dynamics of the subject, due to contemporary writers of the school of Vienna,[1] there has been only one major achievement in this field since 1900. That achievement was the work of Pareto, whose *Manuel* (and particularly its mathematical appendix) contains the most complete static theory of value which economic science has hitherto been able to produce.

Of all Pareto's contributions there is probably none that exceeds in importance his demonstration of the immeasurability of utility. To most earlier writers, to Marshall, to Walras, to Edgeworth, utility had been a quantity theoretically measurable; that is to say, a quantity which would be measurable if we had enough facts. Pareto definitely abandoned this, and replaced the concept of utility by the concept of a scale of preferences. It is not always observed that this change in concepts was not merely a change of view, a pure matter of methodology; it rested on a positive demonstration that the facts of observable conduct make a scale of preferences capable of theoretical construction (in the same sense as above) but they do not enable us to proceed from the scale of preference to a particular utility function.

The first signs of a break-down of the old conception of utility had already made their appearance in Irving Fisher's *Mathematical Investigations into the Theory of Prices*. Fisher had pointed out (1) that the whole theory of equilibrium in a market depends on the assumption of directions of indifference, and does not involve anything more; (2) that with three or more commodities the directions of indifference may not be integrable, so that it is impossible to deduce any utility function from a knowledge of these directions.[1] This latter point also makes its appearance in Pareto; it led him to his celebrated but mysterious theory of " open cycles "; however, it is *not* with that point that we are at present concerned. It is with Pareto's more general and economically more significant contention, that even if it is possible to deduce a utility function from the directions of indifference, that utility function is to a very large extent indeterminate.

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[1] Schönfeld, *Grenznutzen und Wirtschaftsrechnung*; Hans Mayer, *Der Erkenntniswert der funktionellen Preistheorien* (*Wirtschaftstheorie der Gegenwart II*); Rosenstein-Rodan, "La Complementarità" (*Riforma Sociale*, May 1933).

Though Pareto states this conclusion in the text of the *Manuel*,[2] he does not prove it there, and this has no doubt been responsible for the failure of many readers to see its significance. But a proof is given in the mathematical appendix;[3] it is not a difficult proof, and its sense can be set out in words quite easily.

Suppose, for the moment, that we have a utility function given; that is to say, we know, for the individual in question, how much utility he would derive from any given set of quantities of the goods on the market. Then we can deduce from this function (assuming always that he will prefer a higher to a lower utility) a scale of preferences; we can say, of any two sets, whether he will prefer one to the other, or whether they will be indifferent to him. If there are only two sorts of goods, this scale of preferences can be represented by a diagram of indifference curves.

It is thus possible to proceed from a utility function to a scale of preferences; but is it possible to proceed in the reverse direction? The answer is no; for the function with which we started is not the only function which will determine the scale in question. It is not only that there may be an indeterminate constant (this would not matter very much); but we can take as an " index " of utility any variable which has the same value all along an indifference curve, and which increases as we proceed from one indifference curve to a higher one. Thus we might take the function with which we started; or we might take double that function (but this would only mean a change in units); however, we might also take its square, or any variable having a more complex relation with the first, so long as the essential condition of increasing in preferred positions is preserved.

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[1] *Mathematical Investigations*, p. 88. [2] *Manuel*, p. 159. [3] *Ibid.*, pp. 540-2.

To take an arithmetical illustration : Successive positions might be numbered 1, 2, 3, 4, 5; or 1, 4, 9, 16, 25; or 1, 2, 4, 5, 7; or any increasing series we like to take. So far as the actual behaviour of any individual can possibly show, any such series would do absolutely as well as any other.

The methodological implications of this " ordinal " conception of utility have been discussed elsewhere;[1] they are very far-reaching indeed. By transforming the subjective theory of value into a general logic of choice, they extend its applicability over wide fields of human conduct. Two opportunities for the exercise of this new freedom seem of particular importance for the future of economics. One is the economic theory of the state, where the shackles of utilitarianism have always galled; the other is the theory of risk, where the application of the same logic seems fundamental to any progress in economic dynamics.

The present paper, however, is not concerned with these wide questions. Its task is the more pedestrian one of examining what adjustments in the statement of the marginal theory of value are made necessary by Pareto's discovery. As it happens, this task was not by any means completely carried through by Pareto himself. Much of his theory had already been constructed before he realised the immeasurability of utility, and he never really undertook the labour of reconstruction which his discovery had made necessary.

There are, however, two later writers whose work goes some way towards supplying this deficiency; they are W. E. Johnson and R. G. D. Allen. Johnson's work[2] does not appear to spring directly from Pareto; it is based rather upon Edgeworth; but it is much less dependent upon a " cardinal "

[1] Cf. Zawadski, *Les Mathématiques appliquées à l'économie politique*, ch. iii; Schönfeld, *Grenznutzen und Wirtschaftsrechnung*, Part I ; Wicksteed, *Common Sense of Political Economy*, ch. v ; Robbins, *Nature and Significance of Economic Science*, ch. vi.

Reference should also be made to Edgeworth's interesting remarks on Pareto's doctrine (*Papers*, vol. ii, pp. 472-6). It has become increasingly hard to accept Edgeworth's contention that the existence of theories of Public Finance and Industrial Conciliation depending on the measurability of utility ought to be regarded as an argument in favour of maintaining that assumption. For its abandonment need not imply the abandonment of these undoubtedly valuable doctrines ; it serves instead as a stimulus to the construction of new theories of wider validity, into which the traditional teaching can subsequently be fitted as a special case, depending on the introduction of a particular ethical postulate.

[2] "The Pure Theory of Utility Curves," ECONOMIC JOURNAL, 1913.

conception of utility than any of theirs. It was further developed by Mr. Allen in a pair of articles written before our collaboration began;[1] the present paper is the result, first, of my own reflections about Mr. Allen's work, and secondly, of our collaboration in working out the details of a theory which shall be free of the inconsistencies detected in Pareto.[2]

What has now to be done is to take in turn a number of the main concepts which have been evolved by the subjective theory; to examine which of them are affected by the immeasurability of utility; and of those which have to be abandoned, to enquire what, if anything, can be put in their place. It is hoped in this way to assist in the construction of a theory of value in which all concepts that pretend to quantitative exactitude, can be rigidly and exactly defined.

I

1. *Marginal utility.* If total utility is not quantitatively definable, neither is marginal utility. But the theory of value does not need any precise definition of marginal utility. What it does need is only this; that when an individual's system of wants is given, and he possesses any given set of goods, X, Y, Z, . . . we should know his *marginal rate of substitution* between any two goods. The marginal rate of substitution of any good Y for any other good X is defined as the quantity of good Y which would just compensate him for the loss of a marginal unit of X. If he got less than this quantity of Y, he would be worse off than before the substitution took place; if he got more he would be better off; there must be some quantity which would leave him exactly as well off as before.

It will be evident to the reader that this *marginal rate of substitution* is nothing else than what we have been in the habit of calling the ratio of the marginal utility of X to that of Y; we might have called it the "relative marginal utility."

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[1] "Nachfragefunktionen für Güter mit korreliertem Nutzen" (*Zeitschrift für Nationalökonomie*, Mar. 1934); "A Comparison between different definitions of complementary and competitive goods" (to appear in *Econometrica*).

[2] Our co-operation has been so close that it has been completely impossible to separate out his results from mine in any orderly presentation. It has therefore seemed best that I should present our whole theory in a non-mathematical form, while Mr. Allen follows it with a mathematical version. But this division does not of course correspond in any way to the actual process by which the theory was constructed. Mathematics and economics went hand in hand; nor would the reader find it easy to identify our respective shares by a consideration of the technique necessary to reach particular points.

My reasons for suggesting what is certain to be a rather tiresome change in terminology are these. If once we introduce marginal utilities, then, with the best will in the world, it is extraordinarily difficult to keep these two marginal utilities together; they have an almost irresistible tendency to wander apart. It would be possible to work out the whole of the following theory, using as our basic concept the ratio of the marginal utility of X to that of Y, the quantities possessed (or consumed) of all commodities being given; but we should have to keep a strong hold on ourselves, or we should soon be finding some indirect way of talking about one marginal utility by itself—or, what is equally indefensible, talking about the ratio of the marginal utility of X (when one set of quantities is possessed) to the marginal utility of Y (when the quantity possessed is in some way different).

A second reason may perhaps become clear in what follows. There does seem to be some advantage to be gained from concentrating our attention at this early stage on the essentially substitutional character of the concept.

If an individual is to be in equilibrium with respect to a system of market prices, his marginal rate of substitution between any two goods must equal the ratio of their prices. Otherwise he would clearly find an advantage in substituting some quantity of one for an equal value (at the market rate) of the other. This is the form in which we now have to write the law of proportionality between marginal utilities and prices.

When quantities of X and Y are represented on an indifference-diagram (quantities of all other goods possessed being therefore supposed given), the marginal rate of substitution between X and Y is measured by the slope of the indifference-curve which passes through the point at which the individual is situated. This depends simply upon the system of indifference-curves; given the indifference-map, we can read off directly the slope at any point; given the slopes at all points within a region, we can reconstruct the indifference-map for that region.[1]

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[1] For more than two commodities the corresponding proposition is not necessarily true. For n goods, we have n-1 independent marginal rates of substitution (those of X and Y, X and Z, X and W, etc.; the rest can be deduced from these). But from these n-1 marginal rates of substitution it is only possible to construct an indifference-diagram (or what corresponds to an indifference-diagram in n-dimensional space) if some further conditions are satisfied (the integrability conditions). This proposition, which exercises a great fascination over the minds of mathematical economists, remains of doubtful economic significance. Some conclusions which are only valid if the integrability conditions are satisfied, will be given below.

2. *Diminishing marginal utility.* The principle of diminishing marginal utility must similarly give place to *increasing marginal rate of substitution.* Starting with given quantities of all the goods X, Y, Z, . . .; if we first replace a marginal unit of X by that quantity of Y which just makes up for it; and then replace a second marginal unit of X by that quantity of Y which just makes up for this second unit: the second quantity of Y must be greater than the first. In other words, the more we substitute Y for X, the greater will be the marginal rate of substitution of Y for X.

This condition is expressed on the indifference diagram by drawing the indifference-curves convex towards the axes. (The curves must of course always slope downwards if the goods are both positively desired.)

The replacement of *diminishing marginal utility* by this principle of *increasing marginal rate of substitution* is something more than a mere change in terminology. When we seek to translate the principle of *diminishing marginal utility* into definable terms, it does not appear at first sight evident that this is the condition we must use. And it is an interesting historical fact that when Pareto found himself confronted with this question, he first of all gave the condition that the indifference-curves must be convex to the origin, and then went on to add a further condition: that the marginal rate of substitution will increase, not only when Y is substituted for X, but also when the supply of Y is increased without any reduction in the supply of X. This condition looks as good a translation of *diminishing marginal utility* as the other, but (as Pareto ultimately realised[1]) it stands on an altogether different footing. Cases which do not satisfy this latter principle undoubtedly exist in plenty, and there is no particular difficulty in fitting them into a general theory.[2] Exceptions to the true principle of increasing marginal rate of substitution would be much more serious.

For it is certain that for a position to be one of stable equilibrium at given prices, the marginal rate of substitution *at that point* must be increasing. If it is not, then, even if the marginal rate of substitution equals the price ratio, so that the sale of one marginal unit of X would not give any appreciable advantage, nevertheless the sale of a larger quantity would be advantageous. Equilibrium would be unstable—the individual would be at a point of minimum, not maximum, satisfaction.

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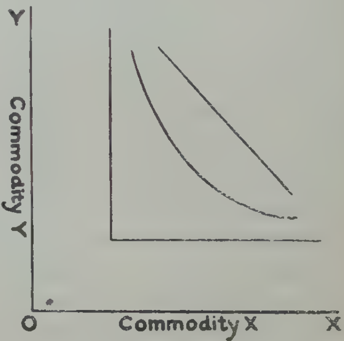
[1] *Manuel* (French edition), p. 573-4 ; cf. the earlier Italian edition, pp. 502-3 (of the 1919 reprint).

[2] See below, sec. ii, 1, of this paper.

The assumption that the principle of increasing marginal rate of substitution is universally true, thus means simply that any point, throughout the region we are considering, might be a point of equilibrium with appropriate prices. There must be some points at which it is true, or we could get no equilibrium at all. To assume it true universally is a serious assumption, but one which seems justifiable until significant facts are adduced which make it necessary for us to pay careful attention to exceptions.[1]

3. *Elasticity of substitution.* The replacement of *diminishing marginal utility* by *increasing marginal rate of substitution* has this further advantage: it becomes significant and useful to ask: " Increasing how rapidly ? " Economists whose theory was based on diminishing marginal utility have rarely had the courage to ask a corresponding question; and when they have done so they have not derived much advantage from it. But our conception is strictly quantitative; and the rate of increase of the marginal rate of substitution may be expected to play an important part in the development of theory.

It is obvious that the two main conditions under which indifference lines are drawn—(1) downward slope, since an increase in either commodity leads to a preferred position; (2) convexity to the origin, from the principle of *increasing marginal rate of substitution*— leave open a wide variety of different shapes which may be taken by the curves. They may vary from the one extreme of straight lines at an oblique angle to the axes (the case of perfect substitutes) to the other of pairs of perpendicular straight lines parallel to the axes (the case of goods which must be used in fixed proportions). Between these extremes any degree of curvature is possible.



I

The curvature of the indifference-curve describes the same property as the " rate of increase of the marginal rate of substi-

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[1] Exceptions would presumably take the form of " blind spots " on the indifference diagram—regions within which no stable equilibrium would be possible. These would also involve the possibility of cases of " Buridan's ass "; the consumer with given income, confronted with given prices, would still be unable to decide between a number of different distributions of expenditure.

tution." But to take either as our measure without correction for units would be impossible—the result would have as little significance as the uncorrected *slope* of a demand curve. A measure free from this objection fortunately now lies ready to our hand. It is the *elasticity of substitution*, when defined in a a way analogous to that used by Mrs. Robinson and Mr. Lerner.[1]
Applied to this problem it becomes

$$\frac{\text{relative increase in the proportion possessed of the two commodities } (Y/X)}{\text{relative increase in the marginal rate of substitution of } Y \text{ for } X}$$

when a small amount of Y is substituted for X, in such a way as to compensate the consumer for his loss. (That is to say, it is taken along the indifference-curve.)

One of the advantages of this particular measure is that it is symmetrical; if we write X for Y, and Y for X, in the above, the result is unchanged. It is therefore a general measure of substitutibility; when the commodities are perfect substitutes, (so that the rate of increase of the marginal rate of substitution is zero), the elasticity of substitution becomes infinite; when they have to be used in fixed proportions (the other extreme) the elasticity of substitution is zero. Negative elasticities of substitution are, of course, ruled out by the principle of increasing marginal rate of substitution.

4. *Complementarity.* If (as appears from the above) any two goods are to be regarded as more or less substitutes, what becomes of the traditional doctrine that two goods may be either competitive or complementary? It will not be possible to give a full answer to this question until much later in this paper, but it is already possible to indicate why the traditional conception entirely fails to accommodate itself to our present construction. The definition of complementary (and competitive) goods given by Pareto and Edgeworth[2] (these seem to be the only major economists who have given an exact definition in terms of the general theory of wants) is completely dependent on the

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[1] Robinson, *Economics of Imperfect Competition*, p. 256; Lerner, "Elasticity of Substitution" (*Review of Economic Studies*, Oct. 1933, pp. 68-70). The definition given in my *Theory of Wages*, though appropriate, under certain assumptions, to the theory of production, is not valid here.

[2] Pareto, *Manuel*, p. 268; Edgeworth, *Papers*, vol. i, p. 117.

notion of utility as a determinate function. On their view, complementary goods are such that an increase in the supply of one will increase the marginal utility of the other; competitive goods are such that the marginal utility of the other will be lowered. This test cannot be translated into terms of marginal rates of substitution; it becomes definitely ambiguous when account is taken of the immeasurability of utility. In the vast majority of cases, the goods will be complementary or competitive, *on this definition*, according to the particular arbitrary measure of utility we choose to take.[1]

For the moment, then, let us put complementarity aside.

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[1] If the utility function could be uniquely defined as $\phi\ (x,y)$, then the Paretian test would be given by the sign of ϕ_{xy}. But if we adopt his own doctrine that any other function of ϕ, $F(\phi)$, could equally well be taken as the utility function, this test breaks down. For

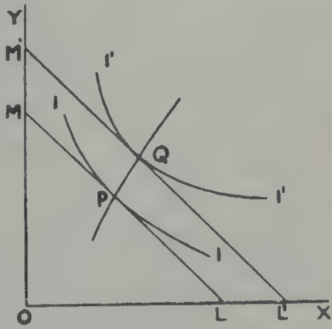
$$\frac{\partial^2}{\partial x \partial y} F(\phi) = F'(\phi) . \ \phi_{xy} + F''(\phi) . \ \phi_x \, \phi_y$$

and in general there is no reason why this should have the same sign as ϕ_{xy}, even though $F'(\phi)$ should be taken as positive.

II

1. *The expenditure curve.* We have in the elasticity of substitution one of the fundamental concepts on which our further enquiries will be based; but it is not by itself an adequate foundation for a theory of value. For the elasticity of substitution refers only to one possible kind of change: that which takes place if one commodity is substituted for another, if, that is to say, the individual moves from one position to another on the same indifference-curve. But this kind of movement is not the only one of which we have to take account. When the conditions of the market change, the individual does not usually move along the same indifference-curve; he is usually made better off or worse off by the change, so that he moves from one indifference-line to another. We, therefore, need information, not only about the shapes of particular curves, but about the mutual relations of the curves.

Take any point *P* on a given indifference-map, and draw the tangent at *P* to the indifference-curve that passes through *P*. Now draw a series of straight lines parallel to that first tangent, and mark off on each line the point where it touches a curve of the system. (By the principle of increasing marginal rate of substitution there can for each line be only one such point.) Now join these points. The curve so formed I shall call an *expenditure-curve*. It follows from the same principle of increasing marginal rate of substitution, that this expenditure-curve can cut any indifference-curve in one point only, and that there can be only one expenditure-curve through any point. But through any point an expenditure-curve can be drawn.[1]



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The significance of this construction should be clear. The point *P* is a position of equilibrium (income being spent wholly upon commodities *X* and *Y*), when the relative prices of *X* and

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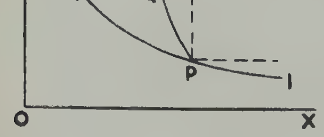
[1] The reason why these further elaborations are not necessary in the theory of production—at least in its elementary stages—is that the assumption of a homogeneous production function implies that all "expenditure-curves" are straight lines through the origin.

Y are as *OM*/*OL*, and when the income of the individual is *OL* (measured in terms of *X*) or *OM* (measured in terms of *Y*). The point *Q* is a position of equilibrium when the relative prices are the same (since the tangents are parallel) but income has increased (from *OL* to *OL′*, or *OM* to *OM′*). The expenditure-curve thus describes the way in which the consumption of the two commodities varies, when prices remain unchanged, but there is a change in total expenditure.

What is the relation between the expenditure-curve through *P* (or rather its slope at *P*) and the elasticity of substitution at *P*? Strictly, they describe different things, for while the latter is a characteristic of a single indifference-curve, the former describes the relationship of one indifference-curve to others. Expenditure-curves of all sorts of slopes are compatible with elasticities of substitution of all sorts of magnitudes.

There is, however, one limitation on this. Since no expenditure-curve can cut an indifference-curve more than once, the variety of possible slopes the expenditure-curve can show is a little more restricted when the elasticity of substitution is low than when it is high. For finite changes, at any rate, an expenditure-curve through *P* which slopes very much to the left, or very much downwards, becomes distinctly more probable the flatter the expenditure-curve at *P* is, though this probability is reduced if there are stretches of greater curvature (or lower elasticity of substitution) in the neighbourhood of *P*.[1] In the case of fixed proportions (elasticity of substitution



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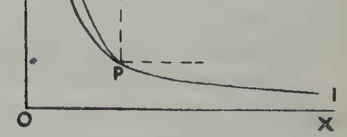

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[1] Very abnormal expenditure-curves (downward or backward sloping) are undoubtedly most likely at the extremities of the indifference-curves; for most indifference-curves become fairly flat as they approach the axes.

zero) the expenditure-curve must of course slope to the right and upwards.

Now if the expenditure-curve is positively inclined, this means that an increase in income will increase the consumption of both commodities (*X* and *Y*). If the expenditure-curve is downward-sloping, an increase in income will increase the consumption of *X* but diminish that of *Y*; if it is backward-sloping, *X* will be diminished and *Y* increased. These latter cases may arise whether or not the goods are easily capable of substitution, but they are distinctly less likely when the elasticity of substitution is low.

It is these cases which are ruled out by Pareto's condition, which we quoted above as a possible interpretation of *diminishing marginal utility*—the interpretation which we discarded. If, for example, the expenditure-curve is backward-sloping, this means that the point *Q* (where the higher indifference-curve has the same slope as the lower curve at *P*) lies to the left of *P*; and since (by *our* principle of increasing marginal rate of substitution) the slope of any indifference-curve must increase from right to left, or diminish from left to right, the higher indifference-curve must have a smaller slope at the point vertically above *P* than the lower indifference-curve has at *P*. The marginal rate of substitution therefore diminishes when *Y* is increased and *X* is left unchanged.

Pareto's condition would thus limit us to positively-inclined expenditure-curves; but there is no particular reason why we should limit ourselves to cases which satisfy this condition.[1] Negatively-inclined expenditure-curves do occur; they are found whenever one of the commodities is an "inferior" good, which is most largely consumed at relatively low levels of income, being replaced (or partially replaced) by goods of higher quality when income increases.

The most convenient measure for that property expressed by the expenditure-curve is simply the elasticity of demand for *X* (or *Y*) *in terms of income*. (The two are interdependent.) We shall find it convenient in this paper to use the conception of elasticity of demand in several senses additional to that given it by Marshall. Strictly speaking, the individual's demand for any commodity depends, not only on the price of that commodity, but also on the prices of all other commodities purchased, *and on his income*. A change in any one of these variables may affect the demand for X; and we can measure the dependence of demand on any of these variables by an elasticity. (Of course, many of these elasticities will usually be negligible.)[1]

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[1] A theory limited by this condition (and by this alone), would not be appreciably simpler than a more general theory; and it would certainly fail to cover all the facts.

The income-elasticity of demand for X therefore

$$= \frac{\text{relative increase in demand for } X}{\text{relative increase in income}}$$

when income is increased by a small amount, but the prices of all goods remain the same.

If there are only two goods purchased (the case to which our expenditure-curve directly refers), then a negative income-elasticity of demand for X means that the expenditure-curve is backward-sloping. A zero elasticity gives a vertical expenditure-curve. An elasticity of unity indicates that the consumption of each good increases in the same proportion as income, so that the slope of the expenditure-curve becomes the same as that of the line OP. If the expenditure-curve is downward-sloping, the income-elasticity of Y must be negative, and consequently the income-elasticity of X must be greater than $\frac{1}{k_x}$, where k_x is the proportion of income initially spent on X.[2]

The conception of income-elasticity of demand is obviously applicable, however many are the goods on which income is spent.

2. *Constant marginal utility.* A simple application of the preceding argument is the translation of Marshall's "constant marginal utility" into exactly definable terms. If the marginal utility of commodity Y is constant, the marginal rate of substitution between X and Y must depend on X only. If the quantity of X is given, the marginal rate of substitution (or the slope of the indifference-curve) is given, too; the tangents to the indifference-curves at all points with the same abscissa must be parallel.

Since the expenditure-curve is drawn through points of parallel tangency, the expenditure-curve must be vertical, and the income-elasticity of demand for X must be zero. This property is again capable of extension to any number of goods. If the marginal utility of any one commodity out of many is constant, the income-elasticities of all the rest will be zero.[1]

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[1] Cf. Lange, "Die allgemeine Interdependenz der Wirtschaftsgrössen und die Isolierungsmethode" (*Zeitschrift für Nationalökonomie* 1932).

[2] This latter proposition follows at once from the condition that $k_x \times$ income-elasticity of demand for $X + k_y \times$ income-elasticity of demand for $Y = 1$; for the small increase in income is supposed to be spent wholly upon X and Y. A similar proposition holds for any number of commodities.

III

1. *The demand-curve.* The two indices we have now developed, the elasticity of substitution and the income-elasticity of demand, describe the two most important characteristics of the individual's scale of preferences in the immediate neighbourhood of the position where he happens to find himself. They are the analytical tools which we may now proceed to apply; and the first object of analysis must inevitably be the ordinary demand-curve.

Here we may conveniently begin with a geometrical treatment, concentrating in consequence on the case where income is spent on two goods only—the case most amenable to the geometrical method.

Income is now to be taken as fixed, and the price of Y as fixed: but the price of X is variable. The possibilities of expenditure open to him are thus given by straight lines joining M ($OM =$ income measured in terms of Y) to points on OX which vary as the price changes. Each price of X will determine a line LM (OL increasing as the price falls); and the point of equilibrium corresponding to each price will be given by the point where the line LM touches an indifference-curve. Joining these points, we get a demand-curve.[2]

Now it is obvious (again from the convexity of the indifference-curves) that any single indifference-curve must be touched by a line through M at a point to the right

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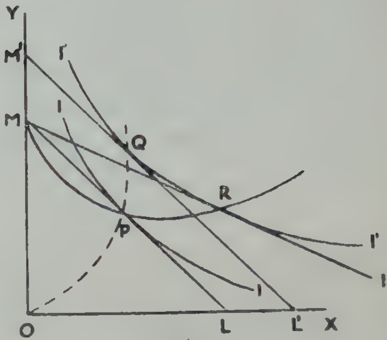
[1] When restated in accordance with this, the argument of Marshall V. 2. (that notable incursion into the dynamic theory of value) remains of course perfectly valid. If the article on which interest is concentrated is only one among many, only a small part of the increase in income due to an early favourable bargain is likely to be spent on that particular article; so that the demand curve for further units is unlikely to be much affected by such market aberrations. That is essentially all Marshall's argument comes to.

[2] Strictly speaking, demand-and-supply curve reversed. Supposing the individual to start with a given amount OM of Y, we might subtract each ordinate of the above curve from OM, and get a demand-and-supply (or offer) curve of the ordinary type.



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of that where it is touched by a line parallel to *LM* and above it. Therefore, as we move on to higher indifference curves, the demand-curve through *P* must lie to the right of the expenditure-curve through *P*; that is to say, the slope of the demand-curve must be less than the slope of the expenditure-curve.

Further, it is fairly evident from the diagram that the difference between these slopes—the extent to which *R* will be pushed to the right of *Q*—will depend upon the curvature of the indifference-curves, that is to say, upon the elasticity of substitution. The greater the elasticity of substitution—the flatter, therefore, the indifference-curves—the greater will be the divergence between the expenditure-curve and the demand-curve.

The increase in demand for a commodity *X*, which results from a fall in its price, depends therefore partly upon the income-elasticity of demand for *X*, and partly upon the elasticity of substitution between *X* and *Y*. We can in fact look upon the increase in demand as consisting of two parts, one of which is due to the increase in real income which a fall in the price of *X* entails, the other to the opportunity of substituting *X* for other goods which results from the fall in the *relative* price of *X*.

The relative importance of these two components depends fairly obviously upon the proportion of income initially spent on *X*. The larger that proportion, the greater will be the increase in real income resulting from a given fall in the price of *X*; and this will increase the importance of the income-elasticity relatively to the elasticity of substitution.

These geometrical and verbal reasonings hardly enable us to proceed to a formula for the elasticity of demand for *X* (in the ordinary sense, elasticity with respect to the price of *X*). But they are exactly corroborated by the algebraic analysis which will be given by Mr. Allen.[1] It is there rigorously proved that with two commodities:

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[1] See Part II of this article, sect. I, 3 (*b*).

$$\begin{aligned}&\text{Price-elasticity of demand for } X\\ &\quad = k_x \times \text{income-elasticity of demand for } X\\ &\qquad + (1 - k_x) \times \text{elasticity of substitution between } X \text{ and } Y\end{aligned}$$

(where k_x is the proportion of income spent upon X).

The price-elasticity of demand is thus not an independent index; it is reducible to the two primary characteristics which we described above.

2. *Extension to more than two goods.* Our formula has this further convenience, that it is capable of extension, with the slightest possible amendment, to the much more important case where more than two goods are consumed. We have only to write, instead of "elasticity of substitution between X and Y," "elasticity of substitution between X and all the other goods taken together." For the rest, the formula remains unchanged.[1]

The sense of this extension can be interpreted as follows: Since it is only the price of X which varies, while the prices of Y, Z . . . remain unchanged, these latter goods remain freely substitutible for each other at fixed ratios given by their relative prices. They behave, therefore, just like perfect substitutes, and a collection of perfect substitutes can be regarded as a single commodity. But the single composite "commodity," which is thus formed by Y, Z, . . . taken together must be regarded as similar to a commodity with a wide variety of *uses*; the substitution among themselves of Y, Z, . . . is of precisely the same character as the reshuffling of quantities of the second commodity among different uses which might very well take place, even if there were only two commodities altogether.

Now it is fairly clear that with two commodities only, the elasticity of substitution between X and Y is likely to be greater, other things being equal, if Y has a wide variety of uses than it will be if Y is very specialised—this is evidently one of the main influences affecting the elasticity of substitution. Applying this to the "many commodities" case, it follows that the elasticity of substitution between X and the "composite commodity" is likely to be greater the more various the components of the latter are, i.e. the smaller are their mutual elasticities of substitution.[2]

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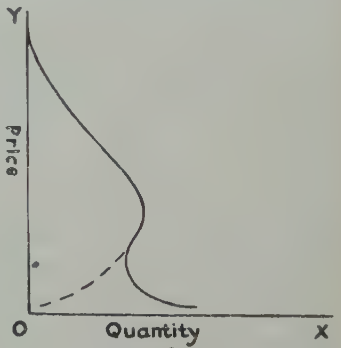
[1] See Part II, sect. II, 4 (*b*).

[2] The elasticity of substitution between X and YZ thus varies inversely with the elasticity of substitution between Y and Z.

Consequently, the elasticity of demand for any commodity is likely to be greater the more various are the objects of consumption with which it is in competition.

3. *The "rising" demand-curve.* Our analysis has now provided us with an exact definition of the conditions on which the elasticity of an individual's demand for a particular commodity *X* must depend. Since, of the two terms of which our formula is composed, the second must be positive, but the first is not restricted in sign, a highly inelastic demand is possible either (1) if both terms are positive and very small, or (2) if the first term is negative. Now, as we have seen, when *X* is only one good among several, it is unlikely that the elasticity of substitution between *X* and the other goods together will be very small, so that a highly inelastic demand is less probable in case (1) than in case (2). In that second case, where *X* is an inferior good, the elasticity of demand will clearly be smaller, the higher the proportion of income spent on *X*.

When the income-elasticity is negative, there is no absolute reason why we should be limited to positive price-elasticities of demand, i.e. to downward-sloping demand-curves. If *X* is a good very decidedly "inferior," so that its income-elasticity is negative and fairly large; if k_x is also large, so that a large proportion of income is spent on *X*; if, finally, the elasticity of substitution between *X* and other goods is moderately small; then the first (negative) term in our formula may outweigh the second (positive) one.



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This possibility can easily be recognised as the celebrated Giffen case referred to by Marshall,[1] when the consumption of bread may actually be reduced by a fall in its price. Our analysis shows that it is perfectly consistent with the principle of *increasing marginal rate of substitution*; but it is only possible at low levels of income, when a large proportion of expenditure is devoted to this "inferior" commodity, and when, among the small number of other objects consumed, there are none that are at all easily substitutible for the first. As the standard of living rises, and expenditure becomes increasingly diversified it is a situation which becomes increasingly improbable.[1]

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[1] Marshall, *Principles*, 8th edition, p. 132.

IV

Complementarity

1. It is perfectly consistent with the theory we have so far elaborated, to suppose that all goods are more or less related in consumption; yet we have made no use of the conception of *complementary and competitive goods*. We have not used it, because we had no need to use it; we had not yet come to the problem where it is relevant.

Substitution, indeed, comes into the theory of value from the start. Any two goods are substitutes—more or less. But complementarity, in the strict sense in which we shall define it, is not a possible property of two goods; it only has sense when the goods in question are at least three.

We have already examined the reaction of a fall in the price of one good on the quantity demanded of that good; and we have discovered that our analysis was applicable, however many other goods are simultaneously consumed. We have now to enquire how such a fall in price reacts on the demand for one particular good out of these other goods.

The same principle which we have previously applied will obviously hold here. The change in the demand for Y resulting from a fall in the price of X will again consist of two parts. (1) There will be the change in demand for Y resulting from the increase in real income; (2) there will be the change in demand resulting from the substitution of X for the rest, owing to the fall in its relative price.

Of these two components, the first will normally be positive, but will be negative if Y is an "inferior" good. The second will depend on how far the substitution in favour of X takes place at the expense of Y rather than of the other goods (Z). If Y and Z are more or less on the same footing in the scale of wants, so that they are sacrificed fairly equally, then the second component will evidently be negative; and such negativeness we clearly ought to regard as the normal case. When the second component is negative, we shall say that *Y is competitive with X against Z.*

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[1] The demand curve on our diagram (p. 21) must first descend from M as the price of X falls (its elasticity > 1). After a time it may rise again (become inelastic); and then—only then—it may curl back towards the Y-axis.

On a price-quantity diagram the resultant curve would look like Fig. 6, page 68. But it might conceivably continue to curve back to the price-axis (dotted line).

On the other hand, it is possible that the substitution in favour of *X* may not, as in this case, take place partly at the expense of *Y*, partly at the expense of *Z*. It may carry with it a simultaneous substitution of *Y* for *Z*; so that the whole effect of the substitution in favour of *X* is that the consumption of *X and Y* is increased, but that of *Z* is diminished—of course, more than in the preceding case. If this is so, we shall say that *Y is complementary with X against Z*; and here the *second component* of the preceding paragraphs will be positive.

For three goods, we may thus distinguish three possible cases; either *Y* and *Z* are both competitive with *X* (against *Z* and *Y* respectively); or *Y* is complementary and *Z* competitive; or *Z* is complementary and *Y* competitive. It is impossible for both *Y* and *Z* to be complementary with *X*, since this would infringe the principle of increasing marginal rate of substitution.

For more than three goods, the possibilities are obviously extended; but it remains impossible for all of the other n-1 goods to be complementary with any one good. It is possible, however, for all the remaining n-1 goods to be competitive with the first.

2. The definition of complementarity just given, although it indicates the most important property of complementary (or competitive) goods, is, as a definition, not altogether satisfactory. For there is implied in it the assumption that when *X* is substituted for *Y* and *Z*, the ratio of the prices of *Y* and *Z* remains unchanged, and it is only the price of *X* relatively to these prices which varies. (Any change in the *YZ* price-ratio would of course affect the quantities substituted.) Since there is implicit in our definition this assumption about price-ratios, we have not succeeded in defining complementarity (as we ought to do) purely in terms of the individual's preference-scale; we are making a reference to the market which is better avoided.

Since there is an indefinite number of ways in which two goods *Y* and *Z* can be substituted for a marginal unit of *X*, it is best to concentrate our attention on that case which is the watershed between competitiveness and complementarity—the case when substitution in favour of *X* tends to leave the amount consumed of Y unchanged. Suppose then that X is substituted for Z, but Y remains unchanged. This simple substitution will affect not only the marginal rate of substitution between X and Z (in the way previously analysed), it will also affect the marginal rate of substitution between Y and Z. Since the quantity of Z is being diminished, the " normal " effect will be to shift the marginal rate of substitution between Y and Z in favour of Z, or against Y[1]; Y is then competitive with X against Z. But if (as is possible) the marginal rate of substitution is shifted in the opposite direction (in favour of Y), then Y is complementary with X.

This second definition is really nothing more than a restatement of the first, and their equivalence is readily shown. If the marginal rate of substitution is shifted against Y, then (if the price ratio between Y and Z remains unchanged), there will be a tendency to substitute Z for Y, i.e. some Y will be sacrificed. If the marginal rate of substitution is shifted in favour of Y, then not only is X substituted for Z (as we are already supposing to be the case), but Y increases at the expense of Z as well.[2]

3. The test of complementarity or competitiveness is thus established: the change in the marginal rate of substitution between Y and Z which follows on a marginal substitution of X for Z. Not only does the direction of this change indicate *whether* the goods are complementary or competitive, but also the degree of change (when properly adjusted) can be used as a *measure* of complementarity. But the definition of this "elasticity of complementarity," and the detailed analysis which it makes possible, are so complex, that we must content ourselves here with a mere statement of results, whose proof must be left over to Mr. Allen's mathematical version.[3]

It is there shown that:

(*a*) the elasticity of demand for Y relatively to the price of X
$= k_x \times$ (Income-elasticity of demand for Y + Elasticity of complementarity of Y with X against Z).

(The elasticity of complementarity is, of course, positive or negative, according as the goods are complementary or competitive.)

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[1] That is to say, it will increase the amount of Y needed to replace a marginal unit of Z.

[2] See Part II, sect. II, 4, 5.

[3] See Part II, sect. II and sect III, 1, 2.

(*b*) If the integrability conditions are satisfied (and as a general rule we may probably take it that they are), so that *a* utility function could be formed, though not one utility function only; then it is true that the elasticity of complementarity of Y with X against Z *equals* the elasticity of complementarity of X with Y against Z. In general, therefore, it is quite correct to talk about X and Y being complementary (or competitive) with respect to Z, without having recourse to the more elaborate terminology we have hitherto employed.[1]

(*c*) From this it can be shown in precisely what way complementarity will be reflected in demand relations. For the elasticity of demand for X relatively to the price of Y $= k_y \times$ (Income-elasticity of demand for $X +$ elasticity of complementarity of XY against Z).

Whether or not this will have the same sign as the elasticity of demand for Y relatively to the price of X thus depends on the difference between the income-elasticities of the two commodities. If this difference is small, the two cross-elasticities of demand will generally have the same sign; but they may not if the difference between the income-elasticities is considerable. If, for example, one of the income-elasticities is positive and the other negative, then we may get reactions of price on demand which go in completely opposite directions—unless the goods are sufficiently complementary (or sufficiently competitive) for this variation to be swamped by the complementarity term.[2]

(*d*) Since the elasticity of complementarity of Y with X against Z measures the extent to which a substitution of X for YZ takes place at the expense of Y (when the relative prices of Y and Z are unchanged); and since the elasticity of complementarity of Z with X against Y measures the extent to which the same substitution takes place at the expense of Z; there must be a relation between these two elasticities and the elasticity of substitution of X with YZ taken together. In the general case, where there are six elasticities of complementarity and three elasticities of substitution (*X* for *YZ*, etc.) we get three equations connecting them, and could thus write the elasticities of substitution in terms of the elasticities of complementarity.

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[1] Subject to the same condition, it follows that of three goods, X, Y, Z, only one pair at most can be complementary.

[2] The valuable investigation into this problem by Professor Henry Schultz ("Interrelations of Demand," *Journal of Political Economy*, August 1933) is limited by the assumption of "constant marginal utility of money" (i.e. of our third good Z). This comes to the same thing as neglecting the income-elasticities of demand, which the present analysis shows to be highly significant for the problem, as they may easily be of comparable magnitude with the (symmetrical) complementarity term.

But when the integrability conditions are satisfied, and the six elasticities of complementarity therefore reduced to three, we can also use these three equations to give us the elasticities of complementarity in terms of the elasticities of substitution.[1] Hence we can derive the following propositions:

> (1) *XY* are more likely to be complementary with regard to *Z*, the lower is the elasticity of substitution between *X* and *Y*, relatively to those between *X* and *Z*, and *Y* and *Z*.
>
> (2) *XY* are more likely to be complementary with respect to *Z*, the larger is the proportion of total income spent upon *Z*, and therefore the smaller the proportion spent on *X* and *Y* together.
>
> (3) If the elasticity of substitution between *X* and *Y* is zero, they must be complementary with respect to any third good less closely related; if the elasticity of substitution between them is infinite, they must be competitive.[2] If the elasticities are equal, they must be competitive.

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[1] See Part II, sect. III, 2.

[2] In this sense, therefore, and in this sense alone, is it possible to say that competitive goods are easily substitutible; complementary goods not easily substitutible. This statement, so agreeable to common sense, turns out to be correct—so long as we speak in relative, not absolute, terms.

V

INDEPENDENCE

1. According to the Edgeworth-Pareto definition of complementarity (based on the reaction of the marginal utility of one commodity to a change in the quantity of the other), it was natural to regard the case intermediate between complementarity and competitiveness (where the effect on the marginal utility is zero) as a case of " independent goods." This definition must be abandoned for the same reason as we have abandoned their definition of complementarity.[1]

Nor is it in any way appropriate to regard the watershed between complementarity and competitiveness (on our definition)[2] as a case of independence. For, if, as would happen at our watershed, the marginal rate of substitution between Y and Z is unaffected by compensating changes of X and Z, this does not mean that the goods are in any useful sense " independent "—there subsists a very complex relation between them.

But there does exist another property to which the term *independence* can much more usefully be applied. If the marginal rate of substitution between Y and Z is unaffected by the quantity of X possessed, then we may say that YZ is *independent* of X.[3] If this condition holds, then it is clear that a substitution of X for Z can exert an influence on the marginal rate of substitution between Y and Z in only one way. The increase in X has no influence at all; it is only the decrease in Z which is effective. But that decrease in Z may still affect the marginal rate of substitution between Y and Z in either direction. For although the normal effect will undoubtedly be to move the marginal rate in favour of Z, nevertheless, if the relationship between Y and Z is such that, were they to be consumed in isolation, Y would be an *inferior* good, then the marginal rate of substitution would be shifted in favour of Y.[4]

It is therefore possible for YZ to be independent of X, and at the same time XY may be either competitive or complementary against Z.

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[1] It was a feeling of disquiet about this definition in the mind of Dr. Rosenstein-Rodan which first led me to a consideration of the whole problem of this paper.

[2] When the elasticity of complementarity is zero.

[3] Similarly, for more than three goods, if the marginal rate of substitution between any pair depends on the quantities of these goods alone, it may be said to be " independent."

[4] See above, sect. II, 1.

2. To say that YZ is independent of X, is a very different matter from saying that X, Y, Z, are independent goods. Can we give any meaning to the latter statement ?

There is only this. If YZ is independent of X, and XZ is independent of Y, then XY may also be independent of Z.[1] If this is the case, then X, Y, Z are clearly independent in a wider sense, which approximates more closely to the older definition.[2] (This can be extended to any number of goods, which will be independent if the marginal rate of substitution between any pair of them depends on the amounts of those goods alone.)

Independent goods may be either complementary or competitive; but it follows from the preceding section that X and Y can only be complementary if Y is an *inferior* good. Further, since the integrability conditions must always be satisfied for independent goods, a substitution of Y for Z must also move the marginal rate of substitution between X and Z in favour of X, i.e. X must be an *inferior* good too. There are thus two possible cases of independent goods:

(1) where all pairs are competitive, and all the income-elasticities positive.

(2) where one pair is complementary, and two income-elasticities negative.

It will be shown in the mathematical analysis that this relation between complementarity and income-elasticity (in the case of independent goods) refers not only to sign, but to magnitude as well. If three goods are independent, then their income-elasticities depend on their complementarities.[3] It would not be difficult to demonstrate this on a three-dimensional indifference-diagram, where it would emerge in the following form : that in this case, given one indifference-surface, all the other indifference-surfaces of the system could be deduced.

This property, however, does not reproduce itself in the case of two commodities. The independence condition[4] is not then sufficient to enable us to deduce other indifference-curves from one curve alone. And so, in the two-commodity case, but only in this case, it is always possible, however the goods are in fact related, to find a pair of independent utility functions which will give us an indifference-map, closely approximating, over a small region, to the true map. This suggests a method of mathematical economic analysis which is much simpler than the quite general analysis followed in this paper, and which will, for small variations, give a close approximation to correct results.

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[1] It will be if the integrability condition is satisfied.

[2] The marginal rate of substitution between any pair XY must then be of the form $f(x)/g(y)$, where x,y, are the quantities possessed. (This can be used as a definition of independence in the case of two goods.) In cases of complementarity and inferiority, $f'(x)$ or $g'(y)$ may be positive, i.e. we must avoid being entrapped again in the law of diminishing marginal utility!

[3] See Part II, sect. III, 3.

[4] See note 2.

Substantially, that method is the method of Marshall; it is one which has rendered great services to economics, even when *rationale* was not fully understood. But it is a method which is applicable, in strictness, only to the case of two commodities; for more than two commodities it loses its generality altogether.[1]

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[1] The second part of this article, by Mr. R. G. D. Allen, will be published in ECONOMICA, No. 2 (May, 1934).

The Rôle of Time in Economic Theory[1]

By P. N. Rosenstein-Rodan

1. The rôle of time in economic theory is a subject which in recent years it has become more and more fashionable to discuss. In the last quarter of a century more has been written about Time and its Mephistophelian[2] influence on the pure simplicity of static analysis, than in the whole century and a half of economic speculation which preceded it. This is not to say that many of the problems discussed under this heading had not been realised before—in fact, many were known and were discussed under other headings. But it is clear that so far the Time factor has not been sufficiently analysed, and it is generally agreed that such analysis constitutes one of the main tasks of economics in the future.

But the term Time is not unambiguous in its significance; discussion of the time element in economics covers problems of a very varying nature.[3] There is, indeed, grave danger that the term Time may lose all precise signification and suffer the same fate as has been suffered by the term Organic in the hands of German and Italian metaphysicians or the terms Static and Dynamic in recent methodological discussion—terms of such ambiguity that their use is often positively misleading.

There are clearly three different sets of problems relating to the time element. There is first the problem concerning the determination of the length of time which economic activity has in view—the problem of the economic period; there is, secondly, the problem concerning the disposition of time between different uses—the problem of time as an economic good; and finally, there are the problems which arise when we investigate the actual process of change through time—the problem of velocities of adjustment. It is submitted that these divisions cover all the main problems of theoretical economics which are specifically due to what may be called a Time factor, and that at the same time they distinguish different problems which it is desirable to keep logically apart. In the following pages an attempt is made to indicate more precisely the exact nature of these problems and to provide outlines of the necessary solutions.

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[1] An Address given to the London Economic Club, June 1932. The first section was given as an address at the meeting of the Econometric Society, Lausanne, September 1931; the last section follows in part the main lines of an article by the present author, "Das Zeitmoment in der mathematischen Theorie des wirtsch. Gleichgewichtes," *Ztschr. f. Natök.*, 1929.

[2] U. Ricci, "Teoria dell' astinenza," *Giorn. d. Econ.*, 1908.

[3] Attempts at classification (which, however, did not succeed in carrying the matter very far) were made by E. Vögelin, "Die Zeit in d. Wirtschaft," *Arch. f. Sozw.*, 1924; B. Foa, *Di alcune influenze del tempo sul valore*, Milan, 1928; and P. B. Wittenburg, *Wirtschaft u. Zeit*, Heidelberg, 1932.

It is inevitable that treatment of these problems should follow to some extent at any rate the terminology and style of the schools by whom they have been chiefly investigated. The first two accordingly will be treated in a terminology which derives from Austrian origins, the third in what for English readers is probably the more familiar terminology of Cambridge and Lausanne.

I. TIME AS THE ECONOMIC PERIOD

2. According to modern economic theory, given the technical and psychological data, i.e. given the stocks of goods, the technical possibilities of transforming them and the different systems of wants, and assuming a unique price in the market, economic relationships are determinate. Whether the latter hypothesis appeals to the Jevonian Law of Indifference, the Walrasian "crying of prices," Edgeworthian recontract or Marshall's constant marginal utility of money, is a matter of detail. Given the tastes and the obstacles, the system is said to be determinate.[1]

But this assertion involves a further assumption which should be explicitly stated. Given the systems of wants and the stocks of goods, their disposition will vary according as a short or a long period of time is under consideration. To each change in the period of time for which one is economising, the economic period as it may be called, there corresponds a change in the optimal distribution of resources. The period of time for which one economises must be defined in order that conduct may be unequivocally determined.

This economic period is not a new nor an independent datum, for it is (or should be) implied in the system of wants itself. For a system of wants can only be considered to be

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[1] For the case of multiple equilibria (neglected here), see p. 96.

“ given ” when its structure in time is also given. But this has not always been made clear, a failure which is to be explained on two grounds. In the first place, in the early stages of marginal utility theory it was assumed that every detail in the system, both technical and psychological, was given.[1] It thus escaped notice that no special assumption was made about the economic period. In more modern formulations of the theory, however, it is not always assumed that the whole system of wants is known. It may be assumed only that the economic subject is aware of certain properties of the system, the slopes of the Indifference lines at the point at which he is situated, and so on. But here too the period of time over which economising takes place is an essential feature of that part of the system which must be known or derived. Secondly, in the works of the mathematical economists, while all the economic quantities were assumed to be rates of flow[2] rather than stocks, nothing was said about the total length of time over which the flow took place. It can only be assumed that this period was taken to be infinite. But this assumption is highly unrealistic—at least as regards the ordinary run of wants. It is certainly not the general rule that provision must be made for eternity. Even in cases where people act as though they were providing for eternity, as in the case of maintaining capital intact for one's descendants, or for any other purpose, this is to be considered as a specific *concrete* case logically on all fours with the preference for apples rather than pears ; we cannot assume it to be *general* as we do the formal laws of the system. We have therefore certainly no right to assume that “ provision for eternity ” is *inherent* in the conception of a system of wants itself, any more than the superiority of pears over apples. When a man makes provision only for his lifetime he does not maintain his capital, but on the contrary consumes some of it. No doubt this is not always done. People do provide for periods longer than their own lifetime, but as we have said already, this is a peculiarity, to be explained by historical, social, ethical factors, etc., but not an inherent structural property of the utility function.

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[1] Properties of the structure of the system of wants, such as their divisibility, alternativeness, periodicity, etc., were assumed. But nothing was said about the length of time covered by the system.

[2] cf. A. Cournot, *Recherches sur les principes math. de la théorie des richesses*, Paris, 1838, p. 55. W. St. Jevons, *Theory of Pol. Econ.*, 1st edn. 1871, 4th edn. 1924, p. 65 : “ It is the rate of supply, rate of production, rate of consumption per unit of time that we shall be really treating.” Wicksteed, *Quart. Journ. of Econ.*, 1889 (reprinted in *Common Sense*, 1933, pp. 734-55) : “ Co-ordination . . . ” 1895 (reprinted 1932), p. 19 note. *Common Sense*, 1910 (reprinted 1932), pp. 100-1. Pareto, *Manuel* . . . III, x, p. 148. Knight, and others.

Thus we are not entitled to assume that wants are determined with reference to an infinite period. In most cases the rate of demand for commodities is determined with reference to a finite period in which wants of different kinds recur[1]: the economic period, may thus be divided into sub-periods according to the recurrence of the wants. But only when the factors which determine the length of the economic period[2] are given can we say that the system of wants is given.

3. Now it may be said that the length of the economic period depends on the " horizon of the imagination and will " of the individual. This is no doubt true, but it affords no sufficient explanation. The distinction between types of preference yielding an even, increasing, decreasing or uneven economy through time is suggestive, but it is not exhaustive. Such classificatory generalisations do not greatly aid our formal analysis. What is needed is a principle which shall enable us to give precision to the concept in such a way as to permit it to be combined with other analytical notions.

Such a principle, it is suggested, is to be found in a certain quality of the imperfection of human foresight. In the first approximation of economic analysis it is perhaps legitimate, as Knight and others have argued, to assume that uncertainty is absent. In such circumstances the problem of the economic period does not present itself in any very acute form and it is no doubt partly for this reason that it has been disregarded by those economists who confine themselves to first approximations. But as soon as we introduce the assumption of uncertainty the problem becomes urgent. At the same time, however, the elements of a correct solution seem to present themselves.

Let us consider an individual who establishes an economic plan on a certain definite date. He will estimate his concrete wants[1] (horizontal blocks in Fig. 1) in such a way as to envisage the most important ones as far in advance as possible. He will not be able to foresee his less important concrete wants so far in advance, but as they decrease in importance he will foresee them only for shorter and shorter periods. This is not because he underestimates future wants—in our opinion this would be a false hypothesis[2]—but because the risk factor, which where it can be isolated is represented by a slight modification of the intensity of the concrete wants, becomes so great the further one looks into the future that it becomes impossible in most cases to evaluate the intensity of such wants in isolation. The fact that the uncertainty factor enters in, makes it necessary to keep, as it were, a special account ("blocks of wants," vertical blocks in Fig. 1) in which the concrete wants of the future are all lumped together.

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[1] That in the economic plan provision is made above all for regular, constant or periodically recurring wants has been emphasised by Komorzynski, H. Oswalt, Wicksteed, Knight and others, and has been worked out into a precise form as " the law of periodical recurrence of wants," by Hans Mayer (" Untersuchung zum Grundgesetz d. wirtsch. Wertrechnung," *Ztschr. f. Volksw. u. Spol.*, 1922).

[2] For the literature on the " economic period," cf. Hans Mayer, *op. cit.*, *Ztschr. f. Volksw. u. Spol.*, 1921-2 ; my article " Grenznutzen," in *Handwörterbuch d. Staatsw.*, 4th edn., Vol. IV, 1927, pp. 1197-8 ; and W. Kromphardt, *Die Systemidee im Aufbau der Casselschen Theorie*, Leipzig 1927.

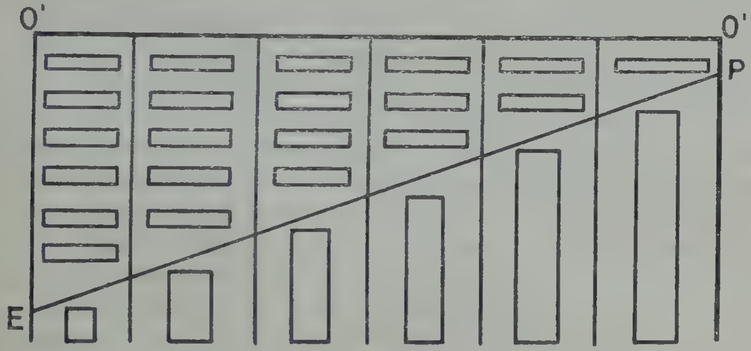

Fig. 1

For example, if an individual having an income of £50 monthly has to make a plan for the coming year (assuming for the time being that he does not want to save) he might allocate £40 to concrete wants and £10 for sundries, i.e. various unspecified items such as amusements, taxis, etc., and other unforeseen petty expenses. The latter, however, would not be planned for in detail, but would be estimated *en bloc* and then apportioned within the limits of this account as occasion arose. A Robinson Crusoe would estimate in kind (i.e. he would allow time for " odd jobs "), the modern economic subject in cash: but the principle is the same. The further one looks into the future the greater the uncertainty becomes, so that a larger and larger proportion of one's wants cannot be foreseen concretely and must therefore be relegated to the Sundries Account. Thus savings may partly be for concrete wants where concrete ends are in view, and partly for this anonymous block of wants where there is uncertainty concerning (*a*) taste and (*b*) income. The blocks of wants into which the uncertainty factor enters, are not those concrete wants in reference to which the laws of utility were first formulated, neither are they classes of wants in the sense of the old " value in use " theories. They are composite magnitudes made up of (*a*) a mixture of different wants which are to a large extent interchangeable, and which, although not concretely foreseen, nevertheless, taken as a whole, are definitely felt as wants[1] and (*b*) a want for security, i.e. for an emergency fund to cover the estimated uncertainty.[2] An important part of this fund is a kind of residual risk account which serves to correct the risks associated with the estimates of the intensity of concrete wants. These risk quotas are interdependent, however ; to a certain extent they cancel one another out,[3] and therefore they are reckoned in the residual risk account as a remainder representing a lump sum.

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[1] "Concrete wants" (Bedürfnissregung) are wants for particular units of good; in contrast to wants for classes of goods (Bedürfnissgattung) as for instance for "bread" in the sense of "value in use" or "total utility."

[2] Cf. Jeremy Bentham's "Propinquity," which is the same as Böhm-Bawerk's, Marshall's and Edgeworth's underestimation of future wants, or the time preference of T. Fisher, F. A. Fetter and others. Jevons: *Theory of Political Economy*, 1st edn., pp. 75, 76, and H. Sidgwick, *History of Ethics*, p. 241 note, incline to the view taken above, which is exactly that taken by Wieser, Pantaleoni, Wicksteed (*Common-Sense*, ch. vii), Knight (*Risk, Uncertainty and Profit*, Boston, 1921, reprint London 1933, pp. 130-6), and Hans Mayer ("Bedürfnis," *Handwörterbuch d. Staatswiss*, 4 Aufl., Vol. II, 1924, p. 454).

Now, the presence of this uncertainty factor is essential[4] to every system of economic wants. It is of fundamental importance not only for the planning of production but also for the planning of consumption. The more remote the period planned for, the greater the proportion of wants which can only be estimated for *en bloc*. The risk factor becomes so great that it is impossible to obtain an isolated idea of particular wants. In consequence the proportion of the diagram occupied by the concrete wants continually diminishes. For the more distant future the borderline between concrete wants and blocks of wants EP cuts the time-line $O'O'$ or approaches it asymptotically. The intersection point determines the finite economic consumption period. It is formally determined by the block of wants and includes all wants that are concretely planned.

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[1] For instance, the desire for comfort, amusement, etc., which can be satisfied by many alternative goods (theatre, cinema, etc.), that is to say not concrete wants for specific goods (as usual in the pure theory), but anonymous wants, where no particular idea is present of what goods will satisfy them.

[2] Whether or no the uncertainty is in actual fact measurable, the individual gives it a definite magnitude in his mind and this determines his action.

[3] The balance of the residual risk account is generally allocated to the block of wants. For the conception of marginal risk, see J. Lindenbaum, " Ein Vierteljahrhundert der Bedarfstheorie der Versicherung," *Ztschr. f. Natök.*, 1930.

[4] It is only by applying the static idealised scheme in which the uncertainty factor is eliminated that we find what important changes this factor brings about. If it were not for the uncertainty factor the subject would, in the first instance, only have to make a plan for the period before equilibrium is reached. After that he would not calculate utilities any more, but would repeat his previous actions automatically. It is, therefore, useful to construct a static ideal scheme corresponding more closely to reality ; in this static scheme the data remain the same, although the subject does not know for certain that they actually will remain the same.

Of course, the individual does not apportion all his resources to concrete wants. Consequently it is only the economic consumption period and not the whole economic period that is formally determined. The utility theory which formerly was only applied to concrete wants is, in its only acceptable modern form (the theory of relative utilities), also applicable to saving. But the individual does not compare the alternatives of saving in exactly the same way as he compares his concrete wants. One can therefore only speak of the relative utility of the different doses of saving in a figurative sense, and in this connection the conception of the economic consumption period is important.

If the structural laws of the block of wants be compared with those of the concrete wants, we submit (1) that the former spring from motives[1] quite different from those that give rise to the latter ; (2) that they are less divisible ; (3) that though the block of wants and the concrete wants are mutually dependent, this interdependence is far less complete in practice than the dependence of concrete wants on one another and therefore, for a certain period, the block wants and the concrete wants are like two markets in partial equilibrium[1]; therefore before the partial independence mentioned in (3) disappears (in the ideally long run), psychic frictions[2] enter into the system of wants and these are entirely different from technical friction. The particular equilibrium will be here the path by which the general equilibrium is reached.[3]

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[1] Namely, more symbolic habitual or traditional motives than those which are effective in the current consumption plan. A psychological analysis would discover qualitatively distinct motives for the two different groups of wants : more conduct than behaviour in the consumption plan, more behaviour than conduct in saving. Wicksteed and Knight both show very clearly how irrational motives predominate in the case of saving. (Knight, *op. cit.*, p. 162, note 2, and p. xix in the new preface to the London School reprint, 1933.) " Conduct " and " behaviour " are used in the Knightian sense (*op. cit.*, ch. iii). By " rational " we mean any action which is thought out beforehand, or reflected upon, i.e. action which is mentally considered in the economic plan before being actually carried out. Such action is therefore consistent (conduct). Any action is then " irrational " which is carried out on the spur of the moment, without any interval of time passing between deliberation and execution. The interval of time between deliberation and execution is thus the criterion by which we distinguish between rational and irrational action.

These facts enable us to understand certain apparent inconsistencies and irrational elements in human behaviour.

The concept of the economic period enables us to determine the limits within which intertemporal utility comparisons are possible. Bailey[4] denies the possibility of comparing values at different points in time, but Prof. Robbins[5] has shown that this is only true when the comparison is made between present and past values. The concept of the economic period also sets a limit to the extent to which values are comparable in the future; since the prospective values can only be compared within one economic period.

4. As time goes on new sub-periods enter into the economic period. If, for instance, the economic period is a year, on January 1st the individual foresees as far as January 1st of the next year; on February 1st, the January of the next year enters the economic period as a new sub-period. If one corresponding new sub-period always entered as an old one passed out—the economic period being of the same length and no saving being made, so that the individual has at any moment the same number of degrees of freedom—we should have an equilibrium *through* time. When we consider the disposition within one economic period we have the problem of equilibrium *in* time.

II. TIME AS AN ECONOMIC GOOD

5. We now come to the second part of our subject—the problem of the disposition of scarce time, the problem of time as an economic good.

It will facilitate this phase of the discussion if we start by considering an individual in a terrestrial paradise, where all the goods are available in unlimited quantities, but in which life is still of limited duration and a day has still only twenty-four hours.[1] In such a state, clearly, although the goods are free goods there is still an economic problem : the satisfaction of one want precludes the satisfaction of another. The individual has still a problem of choice. Time is an economic good.

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[1] Within the market of the concrete wants there is general equilibrium, as also within the market of the block wants, but the markets themselves are partially independent of one another.

[2] cf. p. 95. note 3.

[3] Compare the construction of the "approximate equilibrium" ("equilibrio approssimato") in E. Barone, "Del trattamento delle questioni dinamiche," *Giorn. d. Econ.*, 1894, § 6 et seq.

[4] cf. S. Bailey, *Critical Dissertation on the Nature, Measures and Causes of Value*, 1825, reprint London 1931; and L. Robbins, *Nature and Significance of Economic Science*, London 1932, pp. 59-63.

[5] *Ibid.*

Now, broadly, the logical relation between time and other material goods cannot be affected by the fact that the quantities of these other goods increase so as to make them free goods. In such circumstances, Time is like a chemical element which has always been an ingredient in a chemical product but was not discernible as such ; now, through dissolution, the goods becoming free goods, it is liberated, i.e. is no longer concealed. If, therefore, time is an economic good in a terrestrial paradise it follows, *a fortiori*, that it is the same in our economic world, which we shall now consider. That this has not always[2] been recognised or mentioned as such is due to two facts: (1) The time costs of consumption, which are the perfect corollary to time costs of production (where specific disutility is involved), were neglected in the economic analysis, probably because they were considered insignificant in relation to the whole time available. (2) If they are not neglected, they do not appear independently, but ought to be taken into consideration in the valuation of the utility of goods themselves; they are thus an element concealed in the notion of an economic good.

The only economist who has recognised explicitly these time costs of consumption is G. Sulzer, who goes out of his way expressly to state the conditions of equilibrium of the disposition of time for consumption (*Zeitverwendungsgleichgewicht hinsichtlich der auf konsumptive Tätigkeiten verwendeten Zeit*[3]). He defines time as a good which is complementary with the other material goods.[4] There is, however, a slight inaccuracy in his terminology. The notion of an economic good applies to material objects which are independent objects of economic disposal. Time as cost of consumption is not an independent object of disposal—it does not enter the economic calculation as a separate item—it is taken into account when valuing the utility of an economic good—it is here, therefore, a joint element of an economic good rather than an economic good proper.

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[1] cf. W. Keilhau, "Der Geltungsbereich der Grenzwertlehre," *Weltw. Arch.*, 1931, § iv.

[2] It was seen in the special case where the time cost of utility calculation is greater than its product, so as to make irrational behaviour rational, cf. S. N. Patten, *Annals American Academy*, 1892-3, pp. 726-8 ; J. M. Clark, " Economics and Modern Psychology," *Jour. of Pol. Econ.*, Vol. XXVI ; Knight, *op. cit.*, p. 67 note and pp. 73-5, and others.

[3] *Die wirtsch. Grundgesetze . . .*, Zurich, 1895, pp. 190-4.

[4] *Op. cit.*, pp. 197, 218.

But whereas time as a cost of consumption is a joint element of economic goods, time as leisure is an economic good proper. An hour of repose is an object capable of disposal—like any other quantity of a material good. This has long been recognised. At one time it was thought that this conception presented difficulties, but these were only due to the fact that the dependence of the utility of time on other goods was recognised much sooner than the principle of general interdependence (or interrelatedness)[1] of the utilities of all goods.

Three elements are distinguishable in this general concept, firstly, the original positive want for leisure ; secondly, the modification of the want for leisure derived from general " disutility " of effort, where " leisure " is negative disutility; and thirdly, its modification due to specific disutility or pain, i.e. the different irksomeness of different kinds of labour.

The distinction between a positive and a derived want for leisure is of no significance for conduct, i.e. for reflective action. It is, however, of psychological relevance for irrational or impulsive behaviour.[2]

As long as we assume an equal " general " disutility, which may be positive or negative, of different productive activities, no new principle is involved, once the general interrelatedness of all economic goods is realised. All that happens is that the rate of substitution between material goods and leisure is modified. A new difficulty arises, however, where "special" disutility, different irksomeness of different kinds of labour, is introduced. It cannot directly be compared in quantitative terms with leisure. Although one hour of leisure may be still the alternative for producing A or B or C—the different irksomeness of labour involved in producing quantities A or B or C cannot be co-ordinated with the quantity of leisure, one hour, which is the technical alternative common to all the three different productions. It could be expressed only in comparison with different amounts of utility of leisure. But this is impossible, since utilities are immeasurable. The problem can be solved, however, either by assuming that the individual constructs separately the indifference lines between the production of A and leisure, production of B and leisure, production of C and leisure, etc., and co-ordinates the "net utilities" thus obtained subsequently. Or, developing the notion of "elements of goods" treated above, we can solve the problem by assuming an indifference line system which contains not only all the goods including time (= leisure), but also the corresponding elements of goods = time costs of consumption on the one side and special disutility costs[1] on the other side. The production of A produces then two goods; the good A (bear) and the negative good, discommodity, of producing A (bear-hunting); each is represented as one co-ordinate in the system of indifference lines. The cost of A is the discommodity of producing A, which may have positive or negative (where pleasure and not pain of labour is involved) utility. The discommodity of producing A is not an economic good, it is not even a joint good but it is a joint element of a good.

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[1] cf. my article, " Complementarieta . . .", *Riforma Sociale*, 1933, and J. R. Hicks' " Reconsideration of the Theory of Value," supra, p. 52.

[2] Since Gossen and Jevons, we are accustomed to consider the effort, or pain of labour, or disutility as negative utility, which implies that there is a common denominator for utility and disutility. Although " pain " and " pleasure " are different psychic sensations which can co-exist, in the case of conduct the individual is able to transform, by reflecting, the scales of intensities of pain and pleasure into scales of importance : these scales of importance of pain and pleasure have a common denominator. Only in the case of irrational impulsive behaviour—where the individual acts stimulated by the original intensities of sensations and not by the importances attributed to them by reflection—utility and disutility have no common denominator. Only in this case, usually excluded from the sphere of pure economics, the " pain costs " may have a different sense from " opportunity costs." cf. : " However, while to the eye of critical scrutiny there is no ' logical ' distinction between an increasing disutility experienced and an increasing utility foregone, a ' psychological ' difference must be admitted : there is no difference for conduct, but there is one for consciousness . . ." (Knight, *op. cit.*, p. 67). In the case of conduct, disutility is therefore rightly negative utility. It finds its expression in a decreasing relative utility of material goods in respect to the utility of leisure.

In the terminology of the Lausanne school, therefore, the term "joint element of a more complex good" can be expressed by the co-ordinates of an indifference line system representing the consumptive and productive discommodities (one hour of consuming A or B or C and one hour of producing A or B or C). Time as an economic good proper can be expressed by another co-ordinate representing the economic good leisure.[2]

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[1] i.e. pain costs.

[2] Leisure will be here only that use of time for which no other material goods are necessary (for instance, reposing on grass); where material goods are necessary (for instance, reading a book) it is already taken into account as a joint element of the material good (time costs of reading the book).

There will be two co-ordinates for the consumption of A or B or C (utility and time) and two similar co-ordinates for the production of A or B or C.

The general equilibrium is determined, therefore, by a system of indifference lines, all of material goods, represented on four co-ordinates each, and of the good leisure, represented on one co-ordinate only.

III. TIME AS VELOCITY OF ADJUSTMENT

6. We now approach the third division of our subject, the rôle of the time element in actual processes of change—the problem of velocities of adjustment.

Given the initial data relating to tastes and obstacles, the theory of economic equilibrium enables us to determine the final magnitudes of economic quantities. It should therefore enable us to show the effects of any change of data. Provided that the data did not change in the interval, the end position would be attained after a certain period had elapsed. It is, of course, very improbable that the data would not change.[1] But description of the final equilibrium position is only necessary for the purpose of explaining tendencies, and establishing the economic process as a series of successive equilibrium points, each of which is determined by the forces working in a given direction at a given moment. The study of the long run equilibrium positions merely serves the purpose of explaining the intermediate position when all the forces operative have not yet had time to work out their effects.[2]

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[1] " Certain results will follow on certain causes provided no great change, working in a given direction, sets in before the effects of these causes have time for full development. Though the causes perhaps begin to produce the effects assigned to them, they have not gone far before their influence is modified or even overborne by other causes with different tendencies " (A. Marshall, *Industry and Trade*, 4th edn., p. 185). Turgot had already much the same idea in mind when he wrote : " You augment the fundamental value : the circumstances which have before fixed the proportion which the current value bears to this fundamental value cannot but cause the current value to rise until the proportion is re-established. I am aware that this result will not be sudden ; and that in every complicated machine there are frictions which delay the results (des frottements qui ralentissent les effets) most infallibly demonstrated by theory. Even in the case of a fluid perfectly homogeneous, it take time for the level to be restored. It is the same with the equilibrium of the values which we are examining " (Letter to Hume on March 25th, 1767, reprinted in Turgot, *Reflections* . . . New York, 1898, p. 109.) Later, implicitly, the classical economists in their conception of normal prices, and, explicitly, Thünen in *Der Isolierte Staat*, 2nd part.

[2] " The final effect of even short period change may be an indefinite distance in the future, involving the practical certainty that in the meantime the original cause will change in character or cease to operate or be infected with innumerable other causes ; it may be even improbable that the final result will ever be reached, yet the proper and

Although the function of the equilibrium method has been generally recognised in this sense, there has often existed a tendency to put too much emphasis on the explanation of the end position as such, and to neglect the importance of the intermediate positions which constitute the ultimate problem. This is probably due to the influence of a scientific technique in which it is necessary to work out the assumptions under which a unique and unequivocal determination of the equilibrium is possible.

Now the hypotheses on which such a technique is based, viz. (1) a single market price,[1] (2) the instantaneous adjustment of supply and demand, i.e. elimination of the time factor, (3) one change of data at a time (it follows from (2) and (3) that there is no friction arising from the transition), and (4) a unique solution of the problem, i.e. the exclusion of the possibility of multiple equilibria, are all necessary during the first stages of economic enquiry. Later on, however, they have to be dropped. What usually occurs, however, is that they are not dropped.[2] Or if any modification is made, it is the assumption of a single price which goes. The other assumptions usually pass without scrutiny. For this reason the further analysis we propose may not be without its uses.

If we consider the various compensating forces in a state of equilibrium we discover six different reactions :—

(1) demand → price
(2) price → demand
(3) price → supply
(4) supply → price
(5) supply → demand
(6) demand → supply

Since (5) and (6) are already included in (1), (2), (3) and (4)

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only proper way to describe the situation at the moment is to state a tendency toward this theoretical final result " (Knight, " Cost of Production and Price over long and short periods, *Journ of Pol. Econ.*, 1929, p. 306). cf. M. Fasiani, " Contributo ad alcuni punti della teoria della traslazione delle imposte sui ' profitti ' e sui ' redditi,' " *Studi Sassaresi*, 1931, § 11-12, 32-3.

[1] For other formulations of the same hypothesis, see sec. 1.

[2] They are dropped in the genetic theory of the path. Walras : " Elements . . .", 6th ed., § 125 ; Edgeworth, *Mathematical Psychics*, pp. 35-42, Appendix V, and art. in *Giorn. d. Econ.*, 1891 ; Papers, Vol. II, pp. 311-12 and 313-19 ; Marshall, on " Barter," Appendix F, in *Principles* ; E. Barone, " Sul trattamento delle questioni dinamiche," *Giorn. d. Econ.*, 1894 ; Wicksell, *Wert, Kapital und Rente*, Jena, 1894 (London School reprint, 1933), pp. 36-50 ; A. Voigt, " Der ökonomische Wert der Güter," *Ztschr. f. d. ges. Staatswiss.*, 1892 ; G. Sulzer, *op. cit.*, 1895 ; implicitly the older and explicitly the new Austrian school ; J. R. Hicks : " Edgeworth, Marshall, and the indeterminateness of wages ", *Econ. Journ.*, 1930.

(when one neglects price anticipation) it will be sufficient to consider the four former reactions.

Now, in making the assumption that these reactions necessarily lead to equilibrium, one is presupposing that they work out their effects instantaneously, and therefore simultaneously. We are assuming, for instance, that demand reacts on price in the same interval as price reacts on supply, that price reacts on supply in the same interval as price on demand, and so on. The assumption that adjustments are instantaneous[1] conceals here three distinct hypotheses :—

1. That all reactions set in at the same moment.
2. That they take the same length of time.
3. That they take place at the same velocity, either continuously or discontinuously.[2]

If the second and third assumptions, i.e. the assumption of a simultaneous rhythm of adjustment, were true to fact, then clearly the first assumption by means of which time is eliminated would also be a particularly fertile one. But they are definitely not in accordance with the facts, but are merely an artificial formal hypothesis by means of which the phenomena to be studied are synchronised, and the elimination of the time factor is made possible. This omission, however, narrows down the field within which the theory is valid and can be legitimately applied. If we drop this hypothesis[3] a determinate equilibrium is not necessarily reached. For if, for instance, the changes in demand react more quickly on the price than the changes in price react on supply, then at the moment when change in demand has had its full effect on the price, but the change in price has not had its full effect on the supply, the unchanged supply will have a modifying effect on the price as a result of their continual interdependence, and this might alter the adjustment which was necessary for equilibrium. Further, this change would again, according to the interdependence hypothesis, itself have a modifying effect on the other reactions, so that when one assumes a difference in rhythm between the various reactions (disproportionate tempo) an equilibrium would only be reached under very special circumstances, which in actual fact would very seldom be met with.

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[1] Where the strict hypothesis of the simultaneity of adjustments was not adhered to, it was assumed that reactions either (*a*) started simultaneously and had equal duration, or (*b*) started at different moments but had the same duration, or (*c*) started simultaneously but had different duration, or (*d*) started at different moments and had different duration. In the case of (*b*) (*c*) and (*d*) the clausula ceteris paribus meant that the magnitude of price, demand and supply which were reached between the beginning of the change in data and their end position, did not react on one another continuously and simultaneously, so that time was again eliminated. The clausula ceteris paribus covers here, as has often been pointed out, different cetera. As magnitudes reached during this interval do not influence each other, the distinction between continuous and discontinuous velocity is here not relevant (velocity=*duration* time), but where time is not eliminated the distinction between continuous and discontinuous reaction is very important. An exact elaboration and discussion of all the cases here involved is given by M. Fasiani, " Velocita delle variazioni della domanda e dell' offerta e punti di equilibrio stabile e instabile." *Atti della R. Acad. de scienze di Torino*, 1932 (cp. also : " Elementi per una teoria della durata del processo traslativo . . . ," *Giorn. d. Econ.*, 1929, English translation in the *Rev. of Econ. Studies*, 1934), and it is given so well that it is not necessary to do more than to refer to it here.

[2] The hypothesis of equal velocity follows from the first and second hypotheses. Nevertheless, we count it as a separate hypothesis since, when the second is dropped, it becomes an independent condition.

[3] The clausula ceteris paribus excludes in this case only new exogenous changes in data, and not persisting endogenous changes which have been brought about by the initial change of one element. That means only ceteris paribus where cetera are paria.

In order to formulate this more accurately it is necessary to fix the intervals of time[1] during which one of the four adjustments is completed.

If we call the interval of time during which the demand influences the price v_1, the interval during which the price influences the demand v_2, the interval during which the price influences supply v_3, and the interval during which the supply influences price v_4, and compare these different velocities of adjustment (time coefficients) we see that equilibrium is reached when $v_1 = v_2 = v_3 = v_4$. In this case we get a determinate equilibrium and it does not matter whether the velocities of adjustment are independent of one another or not.[2] If the velocities are not equal, however, there are two possibilities; the path towards equilibrium may be convergent or divergent: (1) either the oscillations may pass through various phases until they come to rest and equilibrium is reached, or (2) the changes of one element may, as a result of the non-simultaneous rhythm of adjustments, give rise to a continual chain of new changes, and a kind of perpetuum mobile of changes sets in.[3] In this latter case either the same oscillations continue, or they increase and we have a case of increasing disequilibrium. In neither case is equilibrium reached.[4]

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[1] Where there is continuous adjustment the velocity is given by the duration.

[2] If we assume an anticipation of the future effects of adjustments, the velocities become dependent on one another. We shall, however, neglect this for the time being.

[3] "Fenomeni dinamici che si perpetuano indefinitamente," says M. Pantaleoni. "Di alcuni fenomeni di dinamica economica. Memoria presentata all' associazione per il progresso delle science," Padua, 1909, reprinted in *Erotemi di Economia*, Vol. II, Bari, 1925.

[4] H. L. Moore, H. Schultz, U. Ricci, J. Tinbergen, have worked out the latter case under the simplified hypotheses of linear demand and supply curves, assuming the

An example may make the function of the time factor in equilibrium theory clearer (Fig. 2). In the plan XOY a hare runs along by the wall op, in the direction AB. A dog at C begins to chase him. If the dog calculated correctly he would have to run in the direction CB in order to cut the hare off. This would be the shortest way. In actual fact, however, at each point where the dog finds himself he runs towards the point at which the hare is at that particular moment. When he is at C he sees the hare at A. At D he sees the hare at E and runs in the direction DF. At F he sees the hare at G and runs in the

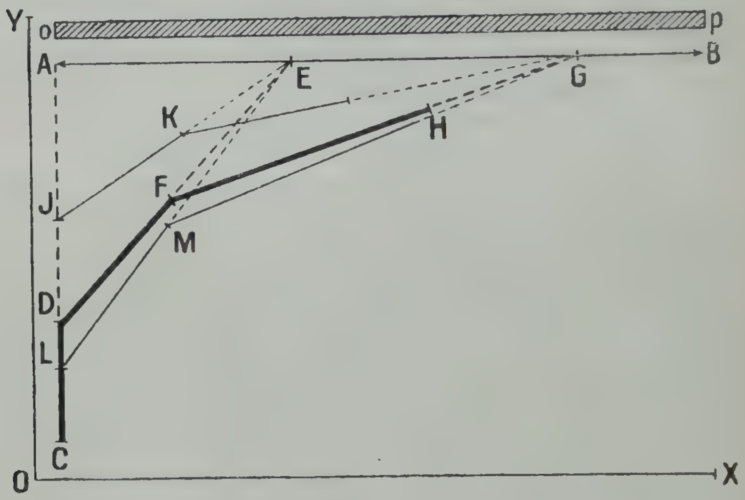

FIG. 2

existence of certain lags. (H. L. Moore, "A moving Equilibrium of Demand and Supply," *Quart. Journ. of Econ.*, 1925, *Synthetic Economics*, 1928, p. 97. H. Schultz, *Statistical Laws of Supply and Demand*, Chicago, 1928 ; *Der Sinn der Statistischen Nachfragekurven*, Bonn, 1931. A. Heydel, "Theory of Trade Cycle" (Polish), *Report of the Congress of Polish Economists*, Poznan, 1929, p. 13. U. Ricci, "Die Synthetische Ökonomik von H. L. Moore," *Ztschr. f. Natök.*, 1930, pp. 654-8. J. Tinbergen, "Die Bestimmung und Deutung von Angebotskurven," *Ztschr. f. Natök.*, 1930, p. 571. A further development and improvement of the theorem was carried by N. Kaldor, "A classificatory note on the determinateness of equilibrium," *Rev. of Econ. Studies*, 1934.) There are three possibilities depending on the quotient of the slopes of the supply and demand curve, namely, (*a*) the demand curve may be steeper than the supply curve in which case we get decreasing oscillations tending to equilibrium ; (*b*) the demand and supply curves may have equal slopes, quotient 1, in which case one has perpetual periodic oscillations ; (*c*) the demand curve may be flatter than the supply curve in which case the oscillations become greater and greater and we get increasing disequilibrium. Taking the curves as linear merely simplifies the problem. Exactly the same thing may be shown with more complicated functions.

direction FH. The course he actually runs $CDFH$ is traced out by means of the dotted lines DA,FE,HG.

These lines give the direction (tendency). This is given by the equilibrium method. But we should have to know the length of the dotted lines, i.e. the velocities of adjustment, in order to determine the course actually followed.

The question therefore arises, can one assume that the velocities of adjustment are given?

They are clearly not original economic magnitudes, but are, like supply and demand, themselves resultants of a number of different economic elements. For an exact analysis starting with the simplest economic determinants, namely, the system of wants and certain given resources, it would be necessary to show the time indices of these data, and especially to work out the intertemporal indifference curves. From these the velocities of adjustment could be deduced.[1]

If all these time data were given (changes in data, as well as the anticipation of adjustments, being neglected) we could trace out the whole path of change. But this use of time data clearly implies the rejection of the hypotheses of a single market price and the instantaneous adjustments (hypotheses 1 and 2, p. 89). In the Lausanne system of equilibrium of consumption where one has: (1), indifference curves; (2) given incomes; (3), equality of demand and supply; the whole emphasis is laid on the equations (3). These equations together give us that price for each commodity for which demand equals supply. If we omit the equations (3) the remaining equations (1) + (2) express the dependence of demand on price, for one can determine the change in demand due to a change in price by means of the indifference curves and the known incomes. Equations (1) and (2) thus give us the effect of price on demand. This is, however, the only effect which is determined by this system of equations. The fundamental supposition that supply and demand are equal is a postulate and does not find expression in the equations themselves. It is outside the system of equations and is based on the assumption that the seller will put up his price as the demand increases. It rests, that is to say, on the assumption that demand has a specific effect on price—which cannot be expressed by the equations of the equilibrium theory.

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[1] cp. *Zeitmoment*, pp. 132-3. Dynamic utility functions of this kind are considered by C. F. Ross, "A Dynamical Theory of Economics," *Journ. of Pol. Econ.*, 1927, and in two articles in *Proceedings of the National Academy of Science*, 1927; H. L. Moore, *Synthetic Economics*, 1927; H. Schultz, *Supply and Demand*, Chicago, 1928; H. Staehle, *Die Analyse von Nachfragekurven . . .*, Bonn. 1929; G. E. Evans, *Mathematical Introduction to Economics*, New York, 1930; J. Tinbergen, " Ein Problem der Dynamik," *Ztschr. f. Natök.*, 1932, and many others. But in these contributions the statistical and not the theoretical utility functions were under consideration. The only theoretically satisfactory solution of this problem has been offered by J. R. Hicks, " Gleichgewicht und Konjunktur," *Ztschr. f. Natök.*, 1933, pp. 444-5. Cp. also G. Myrdal, *Prisbildningsproblemet och foranderligheten*, Stockholm, 1927; E. Lindahl, " The pricing problem from the point of view of capital theory," (Swedish), *Ekon. Tidskrift*, 1929; G. Mackenroth, " Period of Production, Durability and the Rate of Interest in the econ. equilibrium," *Journ. of Pol. Econ.*, 1930; and *Theoretische Grundlagen der Preisbildungsforschung und Preispolitik*, Berlin, 1933 (ch. iii-v).

With the reversible functions of the Lausanne school which are obtained by eliminating the time factor, it is of no importance which of the magnitudes are dependent, and which independent, variables.

If $D = f(P)$ Then $P = p(D)$ (inverse function)

That is to say, from the given dependence of demand on price, the dependence of price on demand immediately follows. If we consider dynamic functions, however, i.e. those that include the time factor, we get irreversible functions, that is to say, one-sided dependences. In this case, $D = f_1(P)$, does not imply any knowledge of the special character of the function $P = f_2(D)$.

7. Up till now we have worked on the hypothesis that the change in data disturbs an equilibrium which has just been reached. As we have seen, this gives rise to two difficulties. (1) A definite equilibrium is not always necessarily reached. We have considered cases of perpetual oscillations, and even of increasing disequilibrium. For this reason alone, it is not advisable always to take a state of equilibrium as one's starting point. (2) As a rule exogenous changes in data begin before the endogenous changes under consideration have fully worked themselves out. That means they take place before the state of equilibrium has been actually attained, if equilibrium would have been obtained at all.

If now a change in data sets in before the state of equilibrium is reached, those forces which tended towards the equilibrium position (1) at first continue to act, but besides these there are the other new forces which are tending to the equilibrium position (2). These two sets of forces, which, though working side by side and to a certain extent against one another, are not causally equitemporal, give rise to certain frictional phenomena which are especially characteristic of the actual economic process, but which cannot be explained by equilibrium theory. L. Amoroso formulates this particularly clearly as follows: " The fundamental supposition of equilibrium theory is that the functions do not change in time. From this it follows that the economic system must necessarily reach a certain foreseen equilibrium position, as a result of the interaction of forces which persist for a greater or lesser interval of time.[1] In actual fact, however, the functions change with time. The economic system moves under the influence of certain forces S from the initial position A to the end position B. But before B is reached the forces change from S to S^1 so that the system itself alters its direction, and now, diverging from B, tends towards another equilibrium position B^1.

Again, before this position is reached, S^1 changes to S^{11} and the system again changes direction to B^{11}. The newly arising forces (*le forze vive*) S, S^1, S^{11} are joined every moment by other forces T, T^1, T^{11}, which express the internal resistance of the system (frictions) to every new disturbance, and which correspond, at least to a certain extent, to inertia in mechanics. The study of the successive changes in these forces, and the corresponding adjustments of the system to them, is the object of economic dynamics."[2]

These frictions[3] arising when a change of data sets in before the previous one had time fully to work out its effects, may alter not only the distance from the theoretical equilibrium position but also the direction (tendency) of the movement. The end position may be a different one from the equilibrium (or disequilibrium) which would have been reached if the same changes in data had set in at greater intervals of time. These *cumulative effects* of changes in data (we consider first two changes) may give rise to different cases:—

a. they may only delay equilibrium, i.e. the same equilibrium which would have been reached if the changes in data set in at greater intervals will be reached after a longer time.

b. a different equilibrium position (as far as distance is concerned) may be reached without the tendency (direction) having been changed.

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[1] This conclusion, however, seems to be doubtful if one considers the possibility of the endogenous perpetuum mobile of changes above mentioned.

[2] L. Amoroso, " La meccanica economica," *Giorn. d. Econ.*, 1924, p. 52.

[3] Frictions as we use them here mean frictions and inertia. It may be misleading to carry out these mechanical analogies too far. cf. Knight, " Statik und Dynamik," *Ztschr. f. Natök.*, 1930 ; but one need not abandon this terminology altogether if one bears in mind that the analogy is a merely superficial one. Frictions express the fact that people fail to adjust—or cannot adjust because of indivisibilities—continuously the changes in their expectations of future events.

c. a different equilibrium may be reached, the tendency (direction) being changed.

d. they may cause (an equal or increasing) disequilibrium, whereas a convergent path towards (or determinate) equilibrium would have been reached if the second change in data had set in in a state of equilibrium.

e. they may lead towards a "definite 'equilibrium'" ("convergent oscillations") whereas perpetual oscillations would have been obtained as the effect of (1) the first change of data alone; (2) of the second change of data setting in in equilibrium.

The mechanism and nature of these cumulative effects have not yet been sufficiently analysed.

18. Let us assume that the cumulative effects of two subsequent changes in data had worked themselves out fully, i.e. that we have one of the cases *b* — *e*. The end position after convergent oscillations (*b*, *c*, *e*,) or the "divergent oscillations" (*d*) may still have *potential effects* which would never actually appear if no new (third) change of data occurred. If a new (third) change of data sets in, they add themselves to its effects, and thus modify the new end position. These modifications may assume the form of cases *a*—*e* enumerated above (pp. 95, 96). A superficial analogy may be made with a glass which is filled so full of water that the surface of the water is slightly higher than the rim of the glass. It is only the force of cohesion which prevents the water from running over. Now, if one drop of water be added, an amount of water far in excess of this one drop will overflow.

The mechanism of these potential effects, like that of the cumulative effects, has not yet been sufficiently analysed.

19. Let us finally drop the fourth hypothesis (p. 89) and consider the case of multiple equilibrium—for theory important; although perhaps less important in practice. There may be a triple multiplicity. 1. *Price Multiplicity*, where different price systems correspond to the same data ; i.e. to the same quantities of goods and their uses—a very improbable case. 2. *Commodity multiplicity*, when with one price system (*a*) different uses may be made of the same quantities of goods (*multiplicity of uses*) (*b*) different quantities of goods may be produced and exchanged (*multiplicity of quantities*), i.e. to the same prices, (*i*) there are more than one set of corresponding

magnitudes of supply and demand and (*ii*) more than one equilibrium of supply and demand. 3. A combination of the foregoing *Price and Commodity multiplicity*, where to a given set of data, various prices and quantities may correspond—the most probable case of multiple equilibria. Each of these alternative multiple equilibria may be determinate or indeterminate. We distinguish the determinate equilibria from the cases of the indeterminate " stable " or " unstable," or in the more appropriate terminology of Mr. Kaldor, " definite " or " indefinite ' equilibria '," i.e. " convergent " or " divergent " paths towards equilibria, because they are independent of the path followed, whereas the latter cases depend on the path.

If the system is already in one of the two possible equilibrium positions, the second alternative equilibrium position is of no importance. But if now a change of data sets in, it may lead again to two alternative equilibrium positions. In the absence of frictions nothing can be said at first as to which of the two alternative equilibria will be reached. The change of data works like a force which may alternatively move at an angle of 90 degrees or 45 degrees.[1] A " dynamic " equilibrium analysis, i.e. the determination of equilibrium out of demands which at any moment are functions of present and expected future prices—with a detailed casuistic of conceivable relations between the expectations of phenomena and these phenomena in future reality—would show how the equilibrium positions through time are partly dependent upon actual and real phenomena, and partly upon expectations. A far more complicated constellation, showing how all these different elements lead towards equilibrium, is necessary. It must further restrict the range of possibility of multiple equilibrium solutions.

In reality where frictions due to variations occurring before the equilibrium is reached, or inertia due to psychic (minimum sensibile) or technical indivisibilities exist, it is most unlikely that these forces of friction will be equal for either of the two alternative equilibria. There will already be, therefore, one preferred equilibrium position, even where under the theoretical static assumptions (neglecting frictions) there are two multiple alternative equilibria. The frictions, usually the complicating element, in this respect eliminate a great difficulty.

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[1] See F. Y. Edgeworth, *Papers relating to Political Economy*, Vol. II, p. 279 note, where the existence of such a case is denied.

Book Reviews

International Economics. By R. F. HARROD. (The Cambridge Economic Handbooks.) London: Nisbet and Co. Cambridge: at the University Press. 1933. x + 211 pp. 5s,

The author has not taken his task lightly and has not written a conventional text-book. On the contrary it is an original piece of work—original, principally, in respect to the mode of presentation: likewise some of the secondary propositions and arguments are novel. It is also a difficult book; I doubt whether a reader, who does not already know much about the subject, will grasp the full meaning of half what is conveyed explicitly and by way of implication in these 200 pages. It is also to be regretted that the reader does not get any hints for supplementary reading on this or that problem. There is practically no literature quoted.

In the first, introductory, chapter, Mr. Harrod discusses whether an economist *qua* scientist is allowed to make recommendations. He thinks that the objection to this, i.e. the principle of " Wertfreiheit " rests on a misunderstanding. The phenomena studied by the economist are largely connected with human purposes, and it must, therefore, be a legitimate task of economic science to test the economic system " by the criterion of how far the purposes which give rise to it find their fulfilment through it " (p. 3).

Mr. Harrod, however, is mistaken if he thinks that this is an objection against the principle of " Wertfreiheit." No advocate of this principle denies that, if we have once postulated a certain purpose, e.g. elimination of unemployment, can we, without transgressing the realm of science, investigate by which economic system this purpose can best be achieved; the trouble is that people think that economics can prove scientifically what ends should be aimed at—from " the economic point of view "—and that some of the purposes put forward most frequently, as e.g. national welfare,[1] are not clearly defined terms, but allow of a great number of interpretations, of which a selection can be made only on the basis of some value judgments—rather, value propositions—which in turn cannot be established scientifically. But this point is of no importance for Mr. Harrod's further argument.

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[1] Strictly speaking also the concepts national dividend, volume of production cannot be defined without reference to certain value judgments. Happily, there are some valuations which are so generally accepted that they can be treated as *the* established values. I have dealt with this problem in my book *Der Sinn der Indexzahlen*, p. 177 *et seq.* and in a paper " Der volkswirtschaftliche Geldwert und die Preisindexziffern " in *Weltwirtschaftl. Archiv*, Vol. XXX, p. 6** *et seq.* July 1929.

Chapter II contains an exposition and discussion of the law of comparative cost and its corollaries. Everything is clear and correct, and only the mode of exposition can be questioned. In this respect I venture to say that this chapter is too elementary for the expert, but too short and too abstract for the beginner and general reader. Mr. Harrod passes somewhat too lightly over the difficulty of comparing costs by pointing out that no comparison of costs between the two countries is necessary, but only a comparison of costs of production of different commodities within each country. This is, of course, quite true, but Mr. Harrod does not explain how the latter is possible. He does not accept the labour cost theory and says that " we must be able to equate land to labourer as elements in cost. . . . If the relative values of the various factors of production are determined, it is then possible to compare the cost of producing commodities A, B, C, etc. in the same country unequivocally " (p. 15). This is unfortunately insufficient, because relative values of the factors are bound to change as soon as international trade sets in.

To a certain extent explicitly, but more by way of implication, this inadequacy is made good in the next chapter on " Potential and actual gain." The former chapter is concerned with the fruits which *can* be reaped by international division of labour. In the next chapter the problem is discussed how productive resources have to be distributed in order to reap the greatest possible gain. Three conditions must be realised: (1) " The price ratios must be the same inside and outside the national frontiers (the Free Trade condition). (2) Rewards to factors must be the same in different occupations. (3) Producers must be prepared to sell their wares at prices proportional to the money costs of production " (p. 58). This is very well formulated, but in my opinion, for a full understanding of all implications by the reader, it is necessary that the reasoning should be linked up with the theory of opportunity cost. If it is demonstrated that under the above conditions price ratios are equal to the ratios of substitution of the different commodities, it becomes evident that an adjustment of the internal price ratios of a country to the external price ratios prevailing outside, in the " world market," involves a gain for the country.[1]

Very instructive is the next chapter on " Comparative price levels." Here the useful distinction of A, B, and C goods is introduced, A goods being staple articles of homogeneous character entering into international trade; B goods are finished goods of a somewhat specialised nature like electrical apparatus for which an organised " impersonal " market on an international scale cannot be established and where, therefore, price differences exist which are greater than transportation costs. C goods are goods that cannot enter international trade. The further discussions do not run in terms of *general* price levels, but in terms of *sectional* price levels, i.e. in price levels of these three classes of goods.

Chapter V contains a brief but lucid summary of the ordinary foreign

[1] I may say that I have tried to elaborate this point somewhat in my book *Der Internationale Handel*, Berlin 1933, p. 136.

exchange theory, specie points, forward foreign exchange, etc. This chapter marks a break in the chain of argument and brings me to the chief objection which I have to raise against the book. The link between the comparative cost doctrine and the money mechanism is not explained in Mr. Harrod's book. It is not demonstrated how comparative *cost* differences are by the money mechanism transformed into absolute differences of *money prices* in such a way that those goods are exported in the production of which a country has a comparative advantage. In order to show that the comparative cost principle has something to do with reality, it is indispensable to explain the working of the money mechanism, under the assumption—as a first approximative subject to subsequent qualifications—of the strict quantity theory. Instead of that Mr. Harrod turns at once to the discussion of what might be termed " the higher theory of the mechanism." There is, therefore, no clear connection between, on the one hand, the chapters on " The Balance of Trade," " When the Gold Standard is abandoned " and " World Monetary Reform," which constitute the most original and, for the expert, most interesting, part of the book, and, on the other hand, the chapters on the comparative cost principle, on which the recommendation of a free trade policy is based.

Let us turn now to the second part.

Mr. Harrod discusses how, after a disturbance, equilibrium of the balance of trade or balance of payments is restored under the working of the gold standard. This analysis seems to me unnecessarily complicated. Suppose exports fall because of an improvement in productive efficiency of a foreign competitor. Two cases are distinguished: (1) Rewards to factors are reduced so as to keep productive resources in reasonably full employment. (2) Factors are allowed to go out of employment.

(1) The traditional analysis would run as follows: Gold will flow out, prices and incomes will fall, imports will diminish, exports rise again a little. In Mr. Harrod's book there is no mention of gold flow, of price fall and reduction of imports. This gap the reader has to make up by his own outside knowledge.

(2) If wages are rigid, unemployment will ensue in the A and B industries which have to bear the brunt of the deterioration. Gold will flow, prices will again fall somewhere, imports will be reduced. Instead of speaking of gold flow etc., Mr. Harrod traces out the repercussion of the fall of income in the A and B industries on C industries and comes to the conclusion that " purchasing power will be automatically reduced by a sufficient amount to entail a reduction in imports equal to that of exports " (p. 110). This result is the same as that of the familiar quantity theory, but there can be no doubt that his explanation is not nearly so easy to understand as the traditional one. True, " outflow of gold " is too vague, it must be translated into diminished demand, falling income, etc. Nevertheless, I should not like to do away altogether with the traditional way of expressing what happens, because it carries with it many useful associations which facilitate the understanding.

What is said about the transition from one equilibrium to another seems to me not very satisfactory. If " consumers spend all and no more than all their income . . . the transition . . . is instantaneous " (p. 115).[1] This is almost unthinkable. I suspect that the matter would be cleared up, if a distinction always were kept in mind which H. Neisser has made in his book, *Der Tauschwert des Geldes* (Jena 1928),[2]—namely between " Kassenreserven " und " Betriebsfond." People keep money (*a*) in order to have a reserve for unforeseen emergencies (*Kassenreserven*) and (*b*) in order to spend it between the points of time at which they receive their income (*Betriebsfond*). Now one can argue, as Mr. Harrod does, that the community " will collectively be holding a smaller monetary balance," when the income has fallen, because some people draw on their reserves in the first sense. But it is not likely that the total " Betriebsfond " will diminish. The latter magnitude can change only if the "periods of payment," especially income payments, are altered. But even if the " Kassenreserven " have not been altered or if one regards such an alteration as insignificant (because the " Kassenreserven " are very small in comparison to the " Betriebsfond ") the transition is not and cannot be instantaneous, because between inflow and outflow of money a certain period of time always has to elapse.

Mr. Harrod then proceeds to analyse disturbances in the balance of payment which are caused by items other than exports and imports of commodities, i.e. the transfer problem. Here again I cannot find his manner of analysis superior to the traditional one, although it constitutes a useful variation of the theme. On two occasions (pp. 120 and 124) he seems to overlook an important point which has been stressed by Ohlin in his discussion with Keynes, namely, that in the receiving country there is an expansion of demand, which facilitates the flow of goods from the paying to the receiving country.

Next the working of the mechanism when the Gold Standard is abandoned is explained. This chapter and the following one on " World Monetary Reform " are a plea for a managed currency. There is first a discussion of what will happen if the purchasing power of the domestic money is kept stable in terms of A and B commodities. If this is done, " and *if there is no change in the relevant special circumstances*, the full employment position will be maintained, however foreign prices behave " (p. 141). There is then an exhaustive examination of the changes in the relevant circumstances, e.g. changes in the prices of particular A and B goods, in the efficiency at home, in other items in the foreign account, etc., and a discussion of how these changes work out under the policy of price stabilisation.

The chapter on " World Monetary Reform " contains a vision of the very distant future. " Reform means management with the specific object of stabilising their (i.e. currencies) value " in terms of goods. Mr. Harrod recognises that there are many possibilities: that the price level of the factors of production, of finished goods, of A, B, or C goods and so on, may be taken as a criterion. There is, of course, the difficulty that it is not always possible to have stable prices and stable exchanges at the same time. Therefore a choice must be made between *(a)* a reformed world money with fixed exchange between countries and *(b)* one without fixed exchanges between countries, the rates being made to move in accordance with the principles of the system. Mr. Harrod comments on a considerable number of combinations, advances and rejects various proposals for various reasons which cannot be reproduced here. His own predilection seems to be for a world money stable in respect to a level of prices which contains also factor prices and prices of C goods, thus involving national variations. He concedes that stability of exchange is a great convenience, but it can be had only if A and B prices are stabilised and the danger of this is that it contains in a progressive society an inflationary element (pp. 172 and 173). " Broadly, however, stability of exchange would be secured. Changes in the rates envisaged would never be likely to exceed 2 per cent. in the course of the year and would probably not be so great. If the changes are to be as small as this, why should they not be dispensed with altogether ? The answer is that these changes, unlike ordinary fluctuations, would usually be all in the same direction; while causing little inconvenience to the ordinary conduct of business, their cumulative effect on the economic situation would be large. Ten years soon pass. Corrective changes in the foreign exchange rates of 2 per cent. per annum amount to 22 per cent. in ten years. A maladjustment of 22 per cent. between home rewards and world prices, which would presumably be outstanding at the end of ten years, if the correction were not applied, is a major disaster " (p. 173).

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[1] ". . . Simultaneous, so that (it) occurs without lapse of time " (p. 111).

[2] Compare also the article by E. v. Micknitz " Umlaufsgeschwindigkeit und Kassenhaltung," *Archiv f. Sozialwissenschaften*, Bd. 62, p. 555 *et seq.*

I cannot find this reasoning convincing. Why should a maladjustment of 22 per cent. be allowed to accumulate ? Why not check it in time ? I think that an economic system which has lost its elasticity to such an extent that it is unable to correct a price and income maladjustment of 2 per cent. a year will, in any case, sooner or later be faced with a dangerous situation, which will force it to take drastic steps. There are many changes, such as shifts in demand, harvest variations, technical progress, a too rapid rise of the wage level—which necessitate price adjustments which might well be larger than 2 per cent. a year. The necessity of making adjustments of this magnitude now and then simply must be faced.

Except for this last passage, most of Mr. Harrod's arguments are very nice and very well reasoned, and I am prepared to subscribe to most of them. But I still doubt whether we shall ever have national monetary authorities who are able, *(a)* to make such decisions as those which Mr. Harrod's plans call for and *(b)* to come to an agreement with others on a common procedure. To give one illustration of the kind of decisions the plan involves, let me reproduce what Mr. Harrod says about tariff-changes. " A country deciding to raise the general level of her import duties or to impose additional ones would have to make up her mind whether this step was intended to be a precursor to a domestic inflation or not. In the former case no change in her exchange rates would occur. . . . If she wishes to avoid an internal inflation, her rate of foreign exchange must be raised sufficiently to offset the effects of the tariff" (p. 176). Mr. Harrod speaks quite rightly of the "primitive and barbarous ideas of economies . . . on which tariff-making is based," and brings them in juxtaposition with "the new scientific ideas of the future" on which his plan is based. Then he adds: "The two simply will not mix" (p. 177). Quite so! But is there the slightest evidence that those primitive and barbarous ideas are in any way disappearing? The last chapter is concerned with the tariff question. Most protectionist arguments are discussed and rejected. In my opinion the chapter is too short to convince anybody who is not already a free trader.

On the whole I should say that the book is very well reasoned and full of interesting and stimulating ideas and suggestions. From the point of view of enlightening the public and of preparing the way for practical reforms which are both desirable and feasible the contribution of this book is not quite so effective and useful as one would have wished. I believe that if only a part of the ingenuity and propaganda which is to-day directed towards eliminating the consequences of rigidity of wages, inflexibility of other cost items and of ill-advised activities of the authorities, were used to attack that rigidity and inflexibility itself and to prevent governments doing foolish things, our economic system would be so plastic that it could easily assimilate those changes and disturbances, the consequences of which these complicated schemes of monetary reform are designed to mitigate and counteract.

GOTTFRIED HABERLER.

International Trade. By BARRETT WHALE. (The Home University Library of Modern Knowledge). London: Thornton Butterworth Ltd. 1932. 254 pp. 2s. 6d.

Mr. Whale's little book is written primarily for the general reader. For this reason it does not contain so much complicated economic analysis as Mr. Harrod's book. The fact that I have given it the shorter review is, however, not to be taken as evidence that I consider it less important than the latter. On the contrary, I agree so perfectly with almost every sentence, the exposition of the theory is, in my opinion, so excellent, the weight attached to various considerations so well distributed and the judgment of facts and tendencies so balanced that there seems to me almost no room left for criticism. Mr. Whale does not sacrifice scientific precision in the interests of popularisation. One is always tempted in a popular book to confine oneself to broad generalisations, which do not hold in all, but only in the great majority of cases, rules of thumb, which are easy to understand and provide a fairly correct diagnosis of all situations and a general principle of policy. To many persons the simple sounds always convincing. But in spite of the fact that the theory of international trade (like the theory of money) is especially rich in such useful half-truths, Mr. Whale does not adopt this convenient but dangerous procedure which is e.g. characteristic of Cassel's popular writings. A good example in point is Mr. Whale's treatment of the purchasing power parity theory which is one of the most useful oversimplified propositions in the field of the theory, of international trade. Mr. Whale makes all the necessary qualifications and retains at the same time the useful knowledge which the proposition conveys.

The book covers a wide field of problems. It begins with a brief description of the methods of international payments and the theory of the foreign exchanges. He restates the balance of payments theory and combines it with a qualified purchasing power parity theory. The result is a unified theory of the mechanism, which explains how the equilibrium of the balance of payments is maintained or, in case of a disturbance, restored. The working of the mechanism under the gold standard and with inconvertible paper currencies is in principle the same. These are just two special cases, distinguished by the institutional setting. The author then discusses the comparative cost doctrine and transforms it into a general equilibrium theory of the Cassel-Ohlin type, whereby all the important conclusions as to the advantage of the international division of labour, etc., are retained.

The second half of the book is concerned with the regulation of foreign trade. In Chapter VI Mr. Whale discusses the various arguments for protection. He does not shirk any of the difficulties and displays an admirable command of the theoretical apparatus and an extensive knowledge of facts. The next chapter is devoted to the tactics of commercial policy, the various methods of tariff bargaining, the advantages and disadvantages of various forms of the most favoured nation clause, etc. It goes without saying that our author is in principle a free trader. But here again he avoids dogmatic exaggerations and admits freely that situations are possible and indeed actually occur in which a certain measure of protection is economically advantageous. He shows, however, that such cases are unimportant, difficult to discern and present almost insurmountable difficulties of administration.

Mr. Whale has made an excellent and in some points an original addition to the literature on international trade. It is to be hoped that his book will help to make wider circles acquainted with the results of modern research on this subject.

Vienna. GOTTFRIED HABERLER.

Money; Gold, Silver and Paper. By FRANCIS W. HIRST. Chas. Scribner's
✓ Sons. 1933. xiv+272 pp.

Mr. Hirst says he has not endeavoured to write a "tract for the times," but to put into "modest compass" a "critical history of money from the earliest times down to the present year," written in intelligible English without mathematical formulæ and technical vocabulary. He would have been more successful in reaching this aim if he had been more accurate, but it is decidedly disturbing to be told (p. 170) that the aggregate world production of gold was 712 tons in 1910 and only 22,397 ounces in 1911, and that it attained even smaller figures till 1924, when it suddenly became 19,000,000 ounces. To put thousands instead of millions is a very pardonable slip, and I would not make much of Mr. Hirst's forgetfulness on the same page of the difference between a troy and an avoirdupois ounce if it had not induced him to believe that the world output of gold was 21 per cent. less in 1930 than in 1910. But it is difficult to find an excuse for such a mixing up of the legislation of 1844 and 1928 and such a perversion of familiar history as is involved in his statement " The framers of the Act " of 1844 " wisely provided that, on the application of the governor of the Bank of England, the Chancellor of the Exchequer might, in case of an exceptional emergency, at his discretion authorise . . . the Bank . . . to dispense with the limitation on the issue of notes " and " this permission was granted . . . in the crises of 1847, 1857 and 1866."

In spite of his disclaimer of writing a tract for the times, Mr. Hirst's prime motive seems to be a desire to glorify monetary standards which are, or seem to be, based on the value of one or two metals. I say one or two metals because he is a symmetallist, preferring a combination of gold and silver to gold alone, or silver alone. He nowhere, I think, explains why, if it would be well to bring in silver to help gold, it would not be better still to bring in also some other metals and substances. " We have learnt," he says, " since the War that intrinsic value is as essential as ever it was to a sound currency," and he is so convinced of this that he abhors the idea of even a subsidiary coinage, such as our half-crowns, having an " intrinsic value " much—he does not say how much—below its nominal value, so long as it is partly made of silver; if it is made of copper or paper, his objection seems to disappear.

Hankering after what he calls a " fool-proof and knave-proof " currency, he resolutely refuses to face the fact that there is nothing whatever in the nature of gold and silver to prevent sovereign governments from meddling with gold or silver (or gold *and* silver) standards. Perhaps when Abraham weighed to Ephron the Hittite " four hundred shekels of silver, current money of the merchant," the children of Heth had not thought of meddling by law with the merchants' conception of how much silver there should be in a shekel, but as soon as legislatures, whether autocratic or democratic, acquired the power of prescribing that the shekel or other unit of account should be equivalent to less or more metal than before, the immunity of the standard from " management " disappeared.

It is true that the legislative organ may deny the executive organ the power of altering the standard at will by debasement of coins or devaluation of the unit of account. But does this really protect the standard ? In 1914 the executive easily induced the legislature to abandon it at a few hours' notice, and the same thing happened in 1931 after a few years of temporary restoration. And if the system does offer some very slight protection, is there any difficulty about adopting the same method in regard to a non-metallic standard ? The executive need not be empowered to play about with a paper standard at its own sweet will.

Mr. Hirst is, in fact, quite wrong in thinking that the crying need of modern currencies is to be protected against fools and knaves, if those terms are to be understood in their ordinary sense. Danger and difficulty come not from the dishonest, nor from the cranky believers in unlimited currency. Most influential people are honest, and the principle that limitation of amount is necessary to give value to a currency as well as to any other thing is accepted by an overwhelming majority. The real need is for those persons of ordinary honesty and more than average trust in bank deposits and foreign exchanges and to give demand its proper place alongside " quantity " in the determination of the purchasing power of currencies and gold.

EDWIN CANNAN.

Price Policies of German Public Utility Undertakings. By H. BATSON. Humphrey Milford: Oxford University Press. London. 1933. xx+224 pp. 12s. 6d.

Before considering the price policies of various enterprises in German public utilities, Mr. Batson provides three introductory chapters which help one to assess the significance of the German practice subsequently described. In the first place, there are outlined the general problems which arise from the desirability of controlling public utility enterprises—problems of ownership and management, of profits, of competition and of prices, which spring from the very nature of a public utility. Secondly, a general description is given of the German methods of solving these problems, both from the point of view of practice and of the law. While, thirdly, there is provided a history of the forms of management and ownership of public utilities which have been tried in Germany.

This introduction to the more important results of Mr. Batson's researches appears valuable for at least two important reasons. It gives the general reader, and the reader who is unacquainted with the detailed operation of this branch of German industry, an ability to see the more specialised study connected with public utility charges against a background composed of economic theory in its application to this form of enterprise and of German experience leading up to the time at which the author terminates his study. Moreover—and this will probably be more appreciated by students with some detailed knowledge of the subject—this method of presentation allows much greater conciseness and much greater clarity in the description which follows of the actual policies in four German public utility industries. It seems a little to be regretted that Mr. Batson did not follow this method of separating what are in effect two parts of this work to the extent of incorporating his general remarks on the " nature of costs," and the " structure of the market " in a separate chapter, instead of including them in the chapter on the characteristics of water-supply—to which they have no peculiar application. This method of lay-out tended to dull our appreciation of the uniformity of treatment of the four public utility industries. This is, of course, a small point, and is probably explained away by Mr. Batson's avowed intention of writing as objective a study as possible. Incidentally, the remarks which Mr. Batson finds it necessary to make on the theoretical implications of public utility enterprise, together with his patently considerable knowledge of German experience, make one anxious that he should implement his intention to write a complementary volume " on certain controverted questions of pure theory."

Turning to the second part of this work, Mr. Batson describes the characteristics of and the charges for water-supply, gas-supply, electricity-supply and transportation by tramways. The thread running through these chapters consists very largely of explanations of the reasons why price differentiation is economically defensible, and of description, analysis and criticism, from an economic point of view, of the differentiation that takes place in twenty-eight German cities. This section of the book is noteworthy for the considerable amount of information Mr. Batson has collected and presented in the form of tables, diagrams and charts illustrative of the charges in force. For each utility he presents a tabular analysis of the tariffs, of tariff construction and of the differentiation between different classes of consumers.

In conclusion, it must be said that the results of Mr. Batson's enquiry will have a very considerable interest to the student of economics in providing data of the operation of industries that can be made useful for the purpose of theoretical study. To those whose interest is less general, e.g. to those who are interested in the operation of public utilities in other countries, Mr. Batson provides a wealth of material capable of being used for comparative purposes. The value of any comparison will, perhaps, be lessened by the use of price policies in Germany to achieve certain social ends, and to obtain revenue for the authorities operating the public utility enterprises. It is not easy to see how the author could have overcome these difficulties. Wherever possible, attention has been drawn to the influence of social considerations on the prices charged. While in relation to the second difficulty, it is in the years subsequent to 1930, at which point the study ends, that the need for revenue has played the greatest part in influencing price policy. While this in itself reduces the difficulty, it also reduced the possibility of obtaining a series of figures that might have indicated the significance of this factor. Finally, the public utility administrator should find considerable interest in this description of German experience. As the author himself suggests in another connection, there is much to be gained from the pooling of experience in the operation of such enterprises and in making use of this pooling.

There appears to be a slight error on page 140, line 23, where " elastic " should surely be read for " inelastic."

Jack Stafford.

The Masquerade of Monopoly. By FRANK A. FETTER. New York: Harcourt Brace. x+464 pp. $3.75.

The Dynamics of Industrial Combination. By H. A. MARQUAND. Longmans. viii+203 pp. 12s. 6d.

The closing paragraph in the foreword to Professor Frank A. Fetter's brilliant exposure of the masquerade of American monopoly well explains the purpose of the book. " This essay in a much-neglected field is hopefully dedicated to a nation of victimised consumers, and, not less sincerely, to a nation of victimised business men, many of whom are caught in the toils of vicious commercial practices not of their own making, practices wasteful of public and private wealth, and destructive alike of economic freedom, political justice, and business morals."

The masquerade upon which attention is concentrated is the basing-point system of price agreements, with which Judge Gary so completely baffled the practising members of his profession. Even to many specialised students of economics, the system has hitherto remained little more than a name. The proceedings in the United States Steel Corporation cases before the District and Supreme Courts, and in the investigation by the Federal Trade Commission, fill a small library; and most of us have been content in the belief that all the truth concerning " Pittsburgh plus " is safely enshrined therein. Now at last Professor Fetter brings his entertaining pen, which always compels our attention, and his enlightening analysis, which ensures our understanding, to bear upon these and other records. He explains the working of the basing-point system in a number of industries—steel, hardwoods and maple flooring, linseed oil and cement—and makes clear its economic significance by the apt application of his own law of market areas. By these agreements (under which the " delivered prices " quoted by all factories, wherever situated, are computed by adding to the factory price announced by the leading firm at the basing-point the amount of the freight which would be paid if the goods were despatched from that point to their destination) a degree of monopoly power in local markets is given to most firms sufficient to keep them " loyal," and the factory at the basing-point is specially entrenched against competition. It sells on equal terms with other producers in all markets, but speed of delivery remains an effective incentive to distant buyers to patronise local suppliers; whilst sales by distant producers in the direction of the basing-point become organised dumping, deterred in large measure by the " absorption of freight " (the realised price being less than that received on local sales by the difference in the two freight rates from the basing-point) which the price agreement demands of the competing firm.

The courts, in their attempts to interpret the anti-trust laws, have been hopelessly confused by the limitations on the prohibition of price discrimination included in Section 2 of the Clayton Act of 1914. Instead of price discrimination being recognised as proof of the existence of monopoly, the insertion of the qualifications in the Act reflects "two erroneous ideas; one, that discrimination is a normal incident and evidence of true competition; the other, that the great evil of discrimination was its use by competitors to bring about 'a' monopoly for themselves in the future." In consequence of these mistakes and of the ludicrous approval of discrimination "made in good faith to meet competition," argument has been side-tracked into discussions of the *intent and purpose* of discrimination. "A legalistic habit of throwing every question of plain fact into a séance for mind-readers seems to have been bred of the practice of criminal law."

Professor Fetter neverthless reveals a tenacious confidence in lawyers when he concludes by advocating legislation to prevent price discrimination altogether. He pleads for the requirement and enforcement of publicity for all prices in inter-state commerce, the prices announced to be uniform to all at the place of sale and shipment of the goods. One could wish for another volume from the same author in which the full implications of this attractive proposal were explored. In the meantime, the mind is assailed by difficulties in enforcing it: the detection of secret rebates, the costing problem in complex undertakings, the refusal of producers to supply, the monopolist policy of killing competitors by buying up local raw materials at *higher* prices, and so on. Should Professor Fetter be prohibited from contributing one of his penetrating articles to ECONOMICA for five guineas, unless he does likewise for every American daily that demanded it? This thought-provoking volume has surely brought us a long step nearer to safe reliance upon the self-preserving action of consumers, rather than upon legislation and the courts, in combating the evils of price discrimination: "If the consumers were well advised and would righteously conspire, they might break the back of this unrighteous conspiracy of the producers in any basing-point system, by placing all of their orders with the most distant mills, which make such sales only at a loss." The basing-point firm would, of course, flourish, but only until the ring split!

When Professor Fetter wrote, the advancing depression was already providing evidence everywhere of the instability of integrated businesses and of the inadequate foundation of the schemes for price stabilisation with which they were largely concerned. Professor Marquand's study of the *Dynamics of Industrial Combination* was finished before their collapse was clearly inevitable, and one feels tempted to assume that his conclusion concerning the part which integrated businesses might be expected to play in ironing out trade fluctuations would now conform more closely to the views of such writers as Marshall, Lavington, and Mr. Jewkes. Professor Marquand clearly is not unaware of the weaknesses of integrated concerns, and he provides an excellent study of the devices of the company promoters who launched these water-logged and top-heavy craft into the perils of the open market. He writes convincingly on the need for a race of industrial administrators and for new systems of managerial control, if even the best of them are to be kept afloat and their credulous crews of creditors and shareholders saved from disaster.

Professor Marquand sees in business combinations the means to a reduction of " the wastes of competition," but he does not make clear who wastes what. " Perhaps the most spectacular example of the wastes of such [unregulated free] competition comes from the oil industry," he writes, for as the result of wild-catting of newly discovered wells, " oil and gas are prodigally wasted upon a magnificent scale." Does this mean that product which would otherwise have been marketed is not sold at all, or that the prices received do not equal the expectations of the producers? " Though that is an outstanding instance, in large numbers of other industries equally clear proof of the economy of large-scale production and the limitation of competition can be found " (p. 180). It is to be hoped that the author will not be deterred, by considerations of competitive waste, from examining them in a further volume. In the meantime, his own argument elsewhere (p. 153) throws doubt on the validity of his conception of waste. The American Telephone and Telegraph Company, it has been alleged, " obtained the patents on the automatic telephone after its installation in several cities, so that it would not displace telephone equipment of the old type in which millions of dollars were invested." Professor Marquand's comment on this quotation is that " such an action was probably wise enough, and is an instance of elimination of the wastes of competition." Is it? Monopoly profits were undoubtedly increased, if the improved instruments could be withheld until it paid the monopolist to instal them; but the waste (possibly unavoidably) took place at an earlier period, when instruments were installed of such a life that they became obsolete before they were worn out, and the waste is increased rather than avoided by interference which deprives the public later on of savings from improvements which a free competitor would find it profitable to offer. If a municipal authority has financed the building of dwelling-houses, which, with the rapid improvement of building technique soon come to be regarded as slums, would Professor Marquand regard it as a waste of competition for any private building speculators to be allowed to construct improved dwellings, for occupation at lower rentals, as soon as they considered it profitable to do so? Why this concern for the financial interests vested in the continuance of poverty?

ARNOLD PLANT.

Aspects of the Rise of Economic Individualism. By H. M. ROBERTSON. Cambridge University Press. 1933. pp. xvi+223. 10s. 6d.

A hearty welcome is to be accorded to the *Cambridge Studies in Economic History*, of which Professor J. H. Clapham is the general editor. The present volume is introduced by him as " the first thorough historical discussion in English, and the best discussion I know, of a dogma much debated, though sometimes uncritically received, by economic historians during the last twenty-five years—the dogma which postulates a close, indeed a genetic, relation between Protestantism, or Puritanism, and capitalism, making the first the putative father of the second. . . . The book contributes to the philosophy of economic history and so is fit to stand at the head of this series."

The reader accordingly opens Dr. Robertson's volume with a pleasant feeling of excitement which is, if anything, increased by the promise of the sub-title, offering a criticism not only of Max Weber, the arch-begetter of the heresy, but also of his School. " Many writers," we are informed, " have taken advantage of the unpopularity of Capitalism in the twentieth century to employ " the opinions expressed in the essay on *die protestantische Ethik* " in attacks on Calvinism or on other branches of religion." For the essay " ushered in as heavy an attack on the capitalist position as the materialist writings of Karl Marx." It is a little disappointing to find that an army of Weberians, comparable in quality if not in numbers to the Marxians, fails to be deployed in the pages of this book to sustain the promised attack. At first Ernst Troeltsch, though he has no place in the index, appears about to offer himself as one of the destined victims, but we read on to discover that he is quoted only with approval. Professor Tawney is practically absolved from suspicion as a partisan, though he does not escape criticism for a " grossly misleading " account, in a discussion of the doctrine of self-help, of Dr. Chalmers' views on the old poor law. And it seems only reasonable that the author of *Religion and the Rise of Capitalism* should be featured as a neutral, if not as an ally, in the fight on behalf of what Dr. Robertson calls the historical, by which he means materialist, approach to the origins of capitalism and its spirit, when it is recalled that three of the lines of criticism here directed against Weber's treatment of the problem were outlined in the book in question eight years ago.

The host of politically-minded Weberian adherents, with their alleged weakness for the analytical method of the " ideal type," fails to answer the call, save for Mr. Aldous Huxley, a belated arrival, who conducts himself as a tattered remnant off the field in Dr. Robertson's last chapter. The work of Max Weber himself is treated with a more convincing thoroughness.

The spirit of capitalism became manifest before the Reformation leaders evoked the spirit of Protestantism. Chapter II discusses the methods of big business and the rigour of book-keeping discipline in the Middle Ages, and contains some strictures on the notions of the crude *Vorkapitalismus* of Professor Sombart, another " sociological " historian. These are well expressed, although Dr. Robertson, in his zeal, contrives to antedate the general adoption of the Bill of Exchange technique (p. 48). Chapter III elaborates with illustrations from English sources the position held by Lujo Brentano as to the influence of the idea of the nation state in the break-away from traditionalism, and the connection he establishes between the appearance of subjective value theories and the proneness of the merchant class to economic pamphleteering. Chapters IV to VI examine the views of the religious tractarians and the theologians, both Catholic and Protestant. The author has little difficulty in showing that the early Protestant writers in England and Scotland were nearly all critics of the business-is-business code of ethics. Thomas Lever and Hugh Latimer appear somewhat surprisingly as typical

Puritans, Robert Crowley as a "militant Puritan." The change of tone first discernible in the seventeenth century is attributed to the pressure of outward circumstances. Puritan moralists, writing for the most part for the middle-class townsmen who were excluded by religious laws or social convention from public careers, yielded to the bourgeois embrace and gave a religious sanction to the virtues of plain dealing and vocational pride.

Dr. Robertson seeks to show that a similar transformation in religious ethics occurred in those Catholic parts of Europe where capitalism became the dominant force in economic life. And he rightly argues that if Catholic confessors and preachers adopted the same dogmas for justifying a man's whole-hearted application to a business career as did the Puritan divines, there would not only be strong reason for believing that the Protestant notions of godly behaviour did nothing to promote the spirit of capitalism, but even grounds for supposing that pastors and theologians adapted themselves regretfully, and of course with sublimating intent, to the doctrines of self-interest and *laissez-faire* which members of their flocks themselves propounded under the immediate influence of economic realities. The author gets some satisfaction from bandying quotations with Weber. English readers will be grateful for the account he gives of the sixteenth-century controversy in Germany on the nature of usury, in which the Jesuits took up a more or less liberal position with a dazzling display of casuistical skill; also for his exposition of Catholic teaching in France in the seventeenth and eighteenth centuries on the subjects of the orderly discipline of life and the moral efficacy of work.

The recent study of M. Groethuysen on the Church and the Bourgeoisie has led Dr. Robertson to some useful ammunition dumps; but the careful reader will find little in these quotations to support the contention that the ecclesiastical moralists in France subscribed to any doctrine resembling the exaltation of the "calling" which Weber discovered in the literature of the Protestant "left." Exhortations to an orderly performance of mundane duties, and even to their profitable accomplishment, in the state of the social order in which God expects the Christian's service are one thing; injunctions to seek the certainty of grace by unceasing, ascetic devotion to a toilsome occupation seem (to the present writer at any rate) to be quite another. It would be uncharitable to suggest that Dr. Robertson misunderstands Weber's meaning in the latter's chain of argument based on predestination and the Puritan's consciousness of the Christian's isolation before the unutterable cosmic powers, but he certainly neglects the differences between the Calvinist and the Catholic theological outlooks. It is important, however, not to overlook the essentials of dogma if we are to do justice to Weber's superb analysis of the spirit of capitalism (even though we may disagree with it), nor to forget his association of this spirit with a thrift economy rationally conducted which he was careful to distinguish from the method of the predatory and adventurous spirit that may be found engaged in capitalist enterprise at all favourable times and places. Weber, in his famous essay, admitted that the thesis there expounded was a one-sided affair. "It would also further be necessary," he believed, "to investigate how Protestant asceticism was in turn influenced in its development and its character by the totality of social conditions, especially economic"; and few could have done it better than he.

Large parts of Dr. Robertson's interesting book are taken up with pushing an already open door. But the sections on Catholic teaching will have permanent value. The long seventh chapter, which is filled with miscellaneous reflections on treasure hunting and early captains of enterprise, might well have been omitted. If Dr. Robertson pursues his subject in a further work it is to be hoped that he will reconsider some of his remarks in this chapter upon the sixteenth-century class war (!) in England and on the bullion and price complex in the light of recent research, and as regards the latter topic (pp. 179-82) with more attention to the theory of international trade.

A. V. JUDGES.

The Industrial Revolution in North Wales. By A. H. DODD. Cardiff: University of Wales Press. 1933. xii+422 pp., with maps, index and bibliography.

The Trustees of the Thomas Ellis Memorial Fund and the Board of Celtic Studies showed wisdom in supporting the publication of this important book. The bibliography is full. The maps are detailed, though the first would be more serviceable if the county and national boundaries were coloured in. It should be a standard work for Welsh students.

It is the custom of writers on the Industrial Revolution (and Mr. Dodd among them) to lament the term before proceeding to use it, and to show how very good a title it is. But precisely what sin Arnold Toynbee committed they never tell us. The Industrial Revolution in North Wales was, of course, not self-contained. It was on the circumference of the English movement. A lively account is given of "the spirited proprietors" of land on whom the impact of industrialism fell. In the eighteenth century Wales found herself courted by English capitalists, among other things for her copper, wool and slate. A few, like Thomas Williams, the Anglesey copper king, and the Wilkinsons, the iron-masters of Bersham, made fortunes, but the tendency was for industry to edge away toward the Midlands of England.

The revolution in transport was not too kind to Wales. The Holyhead Shrewsbury turnpike, indeed, opened up the country: while the Cheshire and Shropshire canals included North Wales in their perimeter. But the chief railway kept to the coast: and only the automobile has removed the misery we used to suffer in reaching Mid-Wales at holiday time.

The newest part of the book is the full account of the North Wales woollen industry: and especially interesting is the record of the effort of Shrewsbury to sit on the commercial outlet. The specialties of Wales were Montgomery flannels and Denbigh small cloth, with other short-staple woollens. The industry came through to the water-power stage, but, in spite of coal in Flint and Glamorgan, they were not on top of coal; and they lost out in the 1830's to Rochdale and Yorkshire. There is no evidence that they resisted machinery. Liverpool traders are often mentioned. One can see Lancashire during this period (1750-1850) stretching out its metropolitan arm. The suburbanisation of North Wales by the thronging of Llandudno and other seaside resorts with the industrial hosts of England belongs to the last eighty years. Club cars leave Manchester Exchange daily for Llandudno. North Wales is a continental Isle of Man, with the vast advantage that when it is rough you can go by train.

Mr. Dodd writes well on the human side in the chapters on Life and Labour, Pauperism and Emigration, Revolt (Food Riots, Resistance to the New Poor Law, Chartism). But it is in the chapter on Welsh Woollens that the most poignant paragraph occurs:

> " A striking feature of the middle years of the century was the crowding of former textile workers into occupations like teaching and preaching. Others drifted back to the plough, or sought better opportunities at Newtown or Llanidloes, in the English manufacturing centres or across the Atlantic; many fell on the rates. There are still lonely spots in the Welsh countryside where the traveller may stumble across a rusty heap of textile machinery—hopelessly antiquated, but once the pride of some humble millowner and the fruit of all his savings—buried under the débris of a derelict mill-roof, or lying neglected in a field, not even worth the expense of removal" (pp. 278-9).

Rather strangely, however, the author surmises that the way to industrial revival lies along the co-operative path of the Danish farmer. But the co-operative society of producing craftsmen, so often tried in Germany, has nearly always failed. If Herr Hitler restores it, as he would like to do, perhaps he will send one of his lieutenants to help North Wales. What will the Welsh preachers say then ?

C. R. FAY.

Credit and Peace. A Way out of the Crisis. By FELIX MLYNARSKI. George Allen and Unwin. 1933. 92 pp. 5s.

End the Crisis. A Plea for Action. By FELIX SOMARY. Routledge. 1933. 111 pp. 2s.

These two little books on the causes and cure of the present economic crisis form an interesting contrast. Dr. Mlynarski attributes the exceptional severity of the present depression to the greatly increased rigidity of costs of production, which has largely destroyed industry's power of adjusting itself to a falling level of prices. Increased fixity of wages and of prices of certain cartellised commodities he regards as inevitable, and in any case of minor importance, for " the lowering of prices of raw materials and wages does not influence directly the total purchasing power. What producers gain is lost by the workmen or suppliers of raw materials." (Dr. Mlynarski is apparently of the opinion that demand for labour and raw materials is completely inelastic.) The real source of the trouble is the high and rigid cost due to taxation and heavy fixed interest charges, caused by previous over-borrowing.

To reduce the burden of these heavy overhead costs, Dr. Mlynarski makes a number of suggestions, most of which involve " world planning " on a scale which seems, in the light of recent international developments, to be somewhat Utopian—the conversion of all fixed interest debts throughout the world to lower rates of interest; the devaluation by debtor countries of their currencies by an agreed amount, and the use of the consequent profits on their gold holdings to finance public works; the further financing of debtor countries and the facilitation of their return to the gold standard by credits from the Bank of International Settlements, rendered possible by increased deposits by creditor countries with that institution; the gradual decrease of " Mercantilism," starting with the creditor countries; and the taking of steps to remove fears of a future war. For the future, the violence of industrial fluctuations should be minimised by the universal inclusion in all loan contracts of a clause ensuring that the rate of interest should fluctuate with the wholesale price index (which might be desirable if the change in prices were due to monetary causes, but not if it were caused by changes in the volume of production), and by the building up by governments during prosperous times of " taxation equalisation funds " (which would probably serve to increase both booms and depression unless the fund were held in cash). Dr. Mlynarski also advocates, for reasons which seem to apply only to countries where note-hoarding is preferred to bank deposits, the general extension to commercial banks of the right of limited note issue.

M. Somary, in his refreshingly frank and vigorous little book, while agreeing that our troubles are due largely to the over-borrowing of recent years, is concerned less with the effects of this upon debtors than upon certain creditors and especially upon the banks. These effects have been made infinitely worse by attempts to stave off inevitable bankruptcy, which have involved successively commercial banks, central banks, and governments, and which have given birth to a monstrous brood of tariffs, quotas, exchange restrictions, transfer moratoria, and so forth. The way out is to stop these futile and harmful attempts to avoid the unpleasant effects of past folly. Reduce public expenditure; allow wages, salaries, prices and rents to fall; allow insolvent firms and institutions to go bankrupt—spend no energy " in the hopeless effort to recall corpses to life. New and unfettered organisations will win confidence more easily." If, even so, governments still cannot meet their obligations, let them declare their own insolvency openly and make terms with their creditors that they can reasonably expect to fulfil. Remove exchange and import restrictions, stabilise currencies, and let trade flow again. M. Somary's prescription is not likely to be popular, as he himself recognises, but his claim that the sooner it is carried out the sooner will the crisis come to an end seems to be justified.

F. W. Paish.

Books and Monographs Received

SALVATORE ALBERTI : *La Mortalità Antenatale*. Società "Vita e Pensiero." Milan. 150 pp. L.10.

B. P. ADARKAR : *The Principles and Problems of Federal Finance*. P. S. King. 287 pp. 12s. 6d.

MAURICE ANSIAUX : *L'inflation du Crédit et la Prévention des Crises*. Librairie Dalloz. Paris. 272 pp. 35 fr.

F. E. ARMSTRONG : *The Book of the Stock Exchange*. Pitman. 405 pp. 10s. 6d.

GOTTFRIED HABERLER : *Der Internationale Handel*. Springer. Berlin. 298 pp. R.M. 19·60.

A. A. BERLE and G. C. MEANS : *The Modern Corporation and Private Property*. Macmillan. New York. 382 pp. 20s.

JEAN-YVES LE BRANCHU : *Essai sur le Gold Exchange Standard*. Recueil Sirey. Paris. 270 pp.

L. BROCARD, C. LANDAUER, J. A. HOBSON, L. L. LORWIN, G. DOBBERT, U. SPIRITO : *L'Economia Programmatica*. G. C. Sansoni. Florence. 203 pp.

GEORG BERNHARD : *Die Deutsche Tragödie*. Orbis-Verlag. Prague. 342 pp.

MENTOR BOUNIATIAN : *Crédit et Conjoncture*. Marcel Giard. Paris. 141 pp.

R. D. CHARQUES and A. H. EWEN ; *Profits and Politics in the Post-war World*. Gollancz. 288 pp. 5s.

E. M. DALTROFF : *The Foundation of Industrial Stability*. P. S. King. 138 pp. 7s. 6d.

D. J. DAVIES : *The Economic History of South Wales prior to* 1800. University of Wales Press. 171 pp. 8s. 6d.

J. MERLE DAVIS : *Modern Industry and the African*. Macmillan & Co. 425 pp. 12s. 6d.

MARSHAL E. DIMOCK : *British Public Utilities and National Development*. George Allen & Unwin. 349 pp. 10s. 6d.

PAUL EINZIG : *The Sterling-Dollar-Franc Tangle*. Kegan Paul. 207 pp. 7s. 6d.

D. R. GADGIL and V. R. GADGIL : *A Survey of the Marketing of Fruit in Poona*. Gokhale Institute of Politics and Economics. Poona. 184 pp.

WALTER GANZ : *Geldmarkt und Gold*. Druck der Salesianischen Offizin. Munich. 92 pp.

R. W. GOLDSCHMIDT : *The Changing Structure of American Banking*. Routledge. 318 pp. 12s. 6d.

RONALD GOOD : *Plants and Human Economics*. Cambridge University Press. 202 pp. 5s.

ANTONIO GRAZIADEI : *Les Variations de la Rente et la Propriété de la Terre*. Rieder. Paris. 192 pp. 20 fr.

T. E. GREGORY : *Gold, Unemployment and Capitalism*. P. S. King. 308 pp. 12s.

R. K. HANNAY : *The College of Justice*. Hodge & Co. Edinburgh. 176 pp. 7s. 6d.

H. P. HARTKEMEIER : *The Supply Function for Agricultural Commodities*. University of Missouri Studies. Vol. VII. 79 pp. $1.25.

R. G. Hawtrey: *Trade Depression and the Way Out*. Longmans. 174 pp. 7s. 6d.

G. C. Heseltine: *Town to Country*. Burns, Oates & Washbourne. 72 pp. 1s. 6d.

Herbert G. Hodder: *Principles of Bank Book-keeping*. Pitman. 158 pp. 5s.

Lancelot Hogben: *Nature and Nurture*. Williams & Norgate. 143 pp. 6s. 6d.

Calvin B. Hoover: *Germany enters the Third Reich*. Macmillan. 233 pp. 8s. 6d.

L. C. Jauncey: *Australia's Government Bank*. Cranley & Day. 288 pp. 7s. 6d.

W. Ivor Jennings: *The Law and the Constitution*. University of London Press. 270 pp. 6s. 6d.

Ernst John: *Goldinflation und Wirtschaftsentwicklung*. Heymanns. Berlin. 149 pp.

J. H. Jones: *The Economics of Private Enterprise*. 462 pp. Pitman. 7s. 6d.

John H. Kirk: *Agriculture and the Trade Cycle*. P. S. King. 272 pp. 12s.

Douglas Knoop and G. P. Jones: *The Mediæval Mason*. Manchester University Press. 294 pp. 12s. 6d.

Otto Koellreutter: *Grundriss der Allgemeinen Staatslehre*. 284 pp. R.M.9.

A. H. Mackmurdo: *A People's Charter*. Williams & Norgate. 269 pp. 6s.

Victor de Marcé: *Le Problème des Dettes de Guerre*. Félix Alcan. Paris. 216 pp. 25 fr.

Howard Marshall and Avice Trevelyan: *Slum*. Heinemann. 166 pp. 3s. 6d.

John McFarlane: *Economic Geography*. Fourth edition. Pitman. 687 pp. 10s. 6d.

Hans Morgenthan: *La Notion du "Politique" et la Théorie des Différends internationaux*. Recueil Sirey. Paris. 90 pp. 12 fr.

Radhakamal Mukerjee: *Land Problems of India*. 369 pp. 9s.

New Fabian Research Bureau: *Socialist Credit Policy*. By E. F. M. Durbin. Gollancz. 44 pp. 1s.

New Fabian Research Bureau: *Revision of Treaties and Changes in International Law*. Gollancz. 19 pp. 6d.

S. G. Panandikar: *Industrial Labour in India*. Longmans. 299 pp. 9s.

The Peopling of Australia. Melbourne University Press. 314 pp. 6s. 6d.

Sir Henry Penson: *The Economics of Business Life*. Cambridge University Press. 237 pp. 5s.

The Rt. Hon. Lord Eustace Percy: *Government in Transition*. Methuen. 243 pp. 7s. 6d.

H. L. Puxley: *A Critique of the Gold Standard*. George Allen & Unwin. 272 pp. 10s. 6d.

C. F. Remer: *A Study of Chinese Boycotts*. John Hopkins Press and Oxford University Press. 306 pp. 12s. 6d.

Cromwell A. Riches: *The Unanimity Rule and the League of Nations*. John Hopkins Press and Oxford University Press. 220 pp. 10s. 6d.

Else Runge: *Zur Theorie des Sozialen Dumpings*. Konrad Triltsch. Würzburg. 51 pp. R.M. 2.50.

P. J. Rust and C. A. Rust: *Test Papers in General Knowledge*. Pitman. 100 pp. 2s.

P. J. Rust and C. A. Rust: *Key to Test Papers in General Knowledge*. Pitman. 163 pp. 5s.

Casimir Smogorzewski: *Poland's Access to the Sea*. George Allen & Unwin. 468 pp. 16s.

HENRY SOMERVILLE : *The Catholic Social Movement.* Burns, Oates & Washbourne. 172 pp. 3s. 6d.
UGO SPIRITO : *Capitalismo e Corporativismo.* 156 pp.
JACK STAFFORD : *Essays on Monetary Management.* P. S. King. 230 pp. 7s. 6d.
STOCKHOLM ECONOMIC STUDIES : *Wages, Cost of Living and National Income in Sweden,* 1860-1930. Vol. I, "The Cost of Living in Sweden, 1830-1930." P. S. King. 251 pp. 12s. 6d. *Wages, Cost of Living and National Income in Sweden,* 1860-1930. Vol. II, "Wages in Sweden, 1860-1930." P. S. King. 759 pp. 25s.
JULIUS STONE : *Regional Guarantees of Minority Rights.* Macmillan Co. New York. 313 pp. $3.75.
PAUL STUDENSKI : *Chapters in Public Finance.* Long & Smith. New York. 161 pp.
SYLVIA THRUPP : *The Worshipful Company of Bakers. A Short History.* Published by the Company. 207 pp.
L. URWICK : *Management of To-morrow.* Nisbet. 201 pp. 8s. 6d.
JEAN VAN DER POEL : *Railway and Customs Policies in South Africa,* 1885-1910. Longmans. 151 pp. 7s. 6d.
AMBER BLANCO WHITE : *The Nationalisation of Banking.* George Allen & Unwin and the Fabian Society. 74 pp. 1s. 6d.
JOHN WILLIS : *The Parliamentary Powers of English Government Departments.* Harvard University Press and Oxford University Press. 214 pp. 15s.
NANCY WINDETT : *Australia as Producer and Trader,* 1920-32. Oxford University Press. 320 pp. 15s.
BARBARA WOOTON : *Plan or No Plan.* Gollancz. 352 pp. 5s.
HEINZ O. ZIEGLER : *Die Moderne Nation.* Mohr. Tübingen. 308 pp R.M.16.80.

PUBLICATIONS OF THE LEAGUE OF NATIONS.

Taxation of Foreign and National Enterprises. Vol. II-V. George Allen & Unwin. Vol. II, 467 pp., 12s.; Vol. III, 254 pp., 7s. 6d.; Vol. IV, 216 pp., 6s.; Vol. V, 78 pp., 2s. 6d.
Balances of Payments 1931 *and* 1932. Allen & Unwin, 191 pp. 7s. 6d.

Periodicals Received

L'Actualité Économique. Montreal. October, November, December, 1933.
Annali di Economia. Padua. December, 1933.
Archivio di Studi Corporativi. Pisa. No. 3, Vol. IV.
The Cambridge Bulletin. November, 1933.
Commercio, Rome. October, November, 1933.
Economia. Rome. September, October, November, 1933.
The Economic Journal. December, 1933.
The Economic Record. Melbourne. December, 1933.
El Contador Hondureño. San Pedro Sula, Honduras. October, 1933.
Giornale degli Economisti e Rivista di Statistica. Rome. October, November, December, 1933.
Indian Journal of Economics. Allahabad. October, 1933.
The Indian Journal of Statistics. Calcutta. June, 1933.
Industriförbundets Meddelanden. Stockholm. 1933.
Journal of the Ministry of Agriculture. November, December, 1933 ; January, 1934.
Labour Gazette. Bombay. September, November, 1933.
The Manchester School. Vol. IV, No. 2, 1933.
The National Bank of the Kingdom of Jugoslavia. Belgrade. No. 3, 1933.
Nuovi Studi di Diritto, Economia e Politica. Rome. October, 1933.
The People's Tribune. Shanghai. November, December, 1933.
Revista de Ciencias Económicas. Buenos Aires. August, September, October, 1933.
Revista de Economia y Estadistica. Mexico. October, November, December, 1933.
La Revue du Droit. Quebec. October, November, December, 1933.
La Riforma Sociale. Turin. December, 1933.
Rivista del Diritto Commerciale. Milan. October, 1933.
Rivista Internazionale di Scienze Sociali e Discipline Ausiliarie. Milan. November, 1933.
Scribner's Magazine. January, 1934.
The Sociological Review. January, 1934.
The Social Service Review. Chicago. December, 1933.
The South African Journal of Economics. December, 1933.
Southern Economic Journal. Athens, Georgia. October, 1933.
Temie Discussioni. Milan. Anno 1933-xi.
Währung und Wirtschaft. Berlin. December, 1933.

School Notes

GOVERNORS

His Majesty the King has been graciously pleased to confer the honour of knighthood upon Dr. Kenneth Lee. Mr. Frank Pick has been appointed Chairman of the Council for Art and Industry.

Miss E. J. Haldane and Sir Henry Lyons, D.Sc., Sc.D., F.R.S., a senator of the University, have been co-opted members of the Court of Governors and Council of Management.

STAFF

Mr. S. H. Beaver, M.A., has been recognised as a teacher of Geography in the University of London.

Dr. R. Kuczynski has been appointed Research Fellow in the Department of Social Biology, and has lectured on Population Problems.

Professor Jacob Viner has agreed to deliver the Cobden Lectures on "Commercial Policies in a Disordered World."

AWARD OF HIGHER DOCTORATE

The degree of D.Sc. (Econ.) has been conferred on Lakshmi Chandra Jain for published work in the field of banking and currency.

AWARD OF FELLOWSHIP

Miss Sylvia Lettice Thrupp, who was a former holder at the School of the Metcalfe Studentship, has been awarded a Fellowship by the Social Science Research Council of New York.

Twelve Months of American Dollar Policy[1]

By T. E. Gregory

I. The Epochs of Currency Policy

To explain the monetary history of the U.S.A. in the last twelve months exclusively in terms of the acute and pressing necessities of the moment is tempting but misleading: for such an explanation involves a profound misreading, both of the American mind and of American history, and, therefore, a violent exaggeration of the revolutionary element in the measures taken. They involve, indeed, a thorough-going breach with the immediate past: from one point of view, perhaps, a wanton sacrifice of all the efforts made during two years of successful struggle against domestic panic and external apprehension to conserve the gold value of the dollar. It cannot, I think, be legitimately argued that there was anything in the immediate situation to warrant the abandonment of the gold standard in 1933: the balance of payments on income account was still favourable, even if it was slightly unfavourable after capital items are considered:[2] the closing of the banks provided a temporary safeguard against panic withdrawals of gold and their reopening itself strengthened confidence: the gold stock of the country was immense and could have been mobilised for external defence, without any abandonment of gold, by a temporary (or, if necessary, permanent) measure on the lines of the legislation finally adopted in 1934, by which the internal use of gold would have been discouraged:

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[1] In this article the abbreviation *F.C.C.* will be used for citations from the *Financial and Commercial Chronicle of New York*: the abbreviation *F.R.B.* for citations from the *Federal Reserve Bulletin*, and the abbreviation *D.S.B.E.* for citations from the official compilation *Documents and Statements pertaining to the Banking Emergency* (Washington, 1933: Parts I and II). Events occurring later than the end of March 1934 are not taken into account in this article.

[2] *Vide Economist*, April 14th, 1934, p. 810. Balance on income account for 1932=$131 millions: balance on capital account=$283 millions: national deficit, therefore, $152 millions as compared to $165 millions in 1931.

licences."[1] The difference between the position before April 20th, 1933, and after it is not, in fact, the difference between being upon the gold standard and being off gold: the Executive Order of that date merely *confirmed* the intention of the Administration to *remain off gold*. In that respect it is important, and the six months which followed are full of dramatic incidents of the most varied kind.

II. The First Period of Experimentation

(*a*) *The " Inflation Amendments " to the Agricultural Adjustment Act*

From a very early date in the history of the Roosevelt administration, the unrest among the farming community made itself felt—and naturally so, since the fall of prices of farm products below the level to which prices generally had receded put farmers as a whole into an impossible situation. Mr. Wallace, the Secretary for Agriculture, was pleading for a measure of inflation through the reduction of the gold content of the dollar from 23 grains to 15 or 16 grains before the end of March[2]: but it would be unfair to say that it was only the farmers who were demanding some measure of monetary manipulation. The representatives of the silver-producing states of the Union were equally anxious that something should be done,[3] and the group known as the Committee for the Nation represented the industrial wing of the inflationist camp. By the middle of April, 1933, the President had been won over. On April 19th, a White House conference took place which was directly responsible for the incorporation into the Agricultural Adjustment Act, then before Congress, of the amendments which became known as the " Thomas " amendments or the " inflation amendments."[4] Title III of the

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[1] *D.S.B.E.*, Pt. II, p. 1.

[2] *F.C.C.*, March 25th, 1933, p. 1939.

[3] *Vide F.C.C.*, April 1st, 1933, p. 2155, for various Bills remitted to the Sub-Committee of the Senate Banking and Currency Committee (one to pay foreign debts in silver, another to buy silver by the issue of silver certificates up to $250 millions at not more than $1.25 per oz.). *Vide* also *F.C.C.*, April 8th, 1933, p. 2342 (Devaluation of gold content of dollar, the content fluctuating with commodity prices—proposed in Connally Bill—presumably the first mention of the famous " commodity dollar").

[4] *Vide F.C.C.*, April 22nd, 1933, pp. 2718, 2721. Congressional opinion can be gauged by the speech delivered by the Speaker of the House of Representatives on April 19th at Rochester : " There must be legislation for the debtor class. They must be made able to pay what they owe and we've got to relieve them. We've got a revolution in this country from Pennsylvania to Utah by farmers who will not allow foreclosure sales. The U.S. is the victim of foreign nations who have out-generalled this country by going off the gold standard, selling their goods to us for our gold dollars,

Act[1] is in reality a revolutionary measure, the bearing of which upon the powers of the President is by no means ended by the recent *de facto* stabilisation of the dollar. *Whenever* a series of contingencies arise,[2] the President is authorised, " in his discretion," to

1. *direct* the Secretary of the Treasury to enter into agreements by which the Federal Reserve Banks will conduct open-market operations and purchase directly and hold for agreed periods $3 milliards of U.S. Government securities, in which case no graduated tax on deficiency reserves otherwise necessary will be applied, nor any automatic increase in Federal Reserve discount rates:
2. Cause the Secretary of the Treasury, if agreement proves impossible, to issue notes under the Act of 1862, but " notes issued under this section shall be issued only for the purpose of meeting maturing Federal obligations to repay sums borrowed by the U.S. and for purchasing U.S. bonds and other interest-bearing obligations of the U.S.": the aggregate amount so issued not to exceed $3 milliards, though "such notes and all other coins and currencies heretofore or hereafter coined . . . shall be legal tender for all debts public and private ":
3. Fix the weight of the gold dollar by proclamation, though the limit of devaluation is to be 50 per cent. of the old content.
4. Fix the *weight* of the silver dollar at a definite fixed ratio in relation to the gold dollar in such amounts as he finds necessary from his investigation to stabilise domestic prices or to protect the foreign commerce against the adverse effect of depreciated foreign currencies: finally—

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then hoarding this gold in our banks by ear-marking it. And they are getting ready to go back on the gold standard when they have drained us of our gold." *Vide F.C.C.*, April 22nd, 1933, p. 2722.

[1] Public Act No. 10 of 73rd Congress.

[2] " Whenever the President finds . . . that (1) The foreign commerce of the U.S. is adversely affected by reason of the depreciation in the value of the currency of any other government or governments in relation to the present standard value of gold, or (2) Action under this section is necessary in order to regulate and maintain the parity of currency issues of the U.S. or (3) An economic emergency requires an expansion of credit, or (4) An expansion of credit is necessary to secure by international agreement a stabilisation at proper levels of the currencies of various governments " (Section 43 of Act).

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5. Provide for the unlimited coinage of such gold and silver at the ratio so fixed, or fixed by international agreement, if the U.S.A. enters into any international agreement.

(b) The abandonment of the "Gold Clause"

These inflationary proposals required supplementing. The bulk of the indebtedness, public and private, of the U.S.A. was not expressed as being payable simply in terms of U.S. dollars, but—in view of the historical experiences of the country—in terms of U.S. dollars "of standard weight and fineness." Inflation, therefore, unless accompanied by some alteration in the existing state of the law, would not have availed; creditors could still call upon the Supreme Court to enforce the literal terms of the contract. It was necessary, therefore, to strike a further blow at the established rights of the creditor class: in other words, it was imperative to repudiate the Gold Clause. The Agricultural Adjustment Act had been approved on May 12th, 1933: on May 26th an official statement by the Secretary of the Treasury announced that a Joint Resolution introduced by Representative Steagall[1] "has the support of the administration. . . . Recently, the Thomas Amendment to the Agricultural Relief Act has made all coins and currencies of the U.S. legal tender for the payment of any debt, public or private. *Due, however, to the language used, doubt has arisen whether obligations expressed to be payable in a particular kind of money, such as gold coin, may be satisfied by payment in other forms of legal tender. . . .*[2] One of the purposes of the resolution is to remove any doubt and to avoid confusion, *so that debtors and creditors may have a clear definition of their legal position.*[3] And the purpose of the resolution is to make clear that future obligations, public and private, shall not contain the Gold Clause. The Thomas Amendment did not contain specific provision to this effect. "Such a provision is contained in the resolution (which . . .) makes it clear that all obligations past and future will be upon the same footing."[4]

It must indeed be admitted that without the abrogation of the Gold Clause a policy of inflation would be robbed of one of its greatest elements of attractiveness—the victimisation of the bond-holder. As actually passed, the Joint Resolution of June 5th, 1933:

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[1] Mr. Steagall himself said that "I give it as my humble judgment . . . that this legislation marks a final, definite and determinate step, the taking of which will bring a revival of business and the restoration of prosperity and happiness to the people of the U.S." *F.C.C.*, June 3rd, 1933, p. 3823.

[2] Italics mine.

[3] Italics mine.

[4] *F.C.C.*, June 3rd, 1933, pp. 3822-3.

1. Asserts that "every provision . . . which purports to give the obligee a right to require payment in gold or a particular kind of coin or currency, or in an amount in money of the U.S. measured thereby" is against public policy " and no such obligation shall be contained in, or made with respect to, any obligation hereafter incurred."
2. Provides that every obligation " heretofore or hereafter incurred " shall " be discharged upon payment, dollar for dollar, in any coin or currency which at the time of payment is legal tender for public and private debts."
3. Provides that any such provision " contained in any law authorising obligation by and under authority of the U.S. is hereby repealed, but the repeal of any such provision shall not invalidate any other provision or authority contained in such law."

(*c*) *American policy at the World Economic Conference*

The British Prime Minister arrived in the United States just after the " official " abandonment of gold by the American administration, of which event, according to him, only very inadequate information had reached the ship on which he was travelling. This step, which, of course, deprived Great Britain of an important bargaining weapon, did not prevent agreement upon the fundamental principles which, in the opinion of the two statesmen concerned, required to be adopted in order to implement recovery. The American Government had, indeed, done its best to minimise the significance of the Inflation Amendments. The Secretary of State, Mr. Hull, in a message to the accredited American representatives in France, Italy, Germany and Great Britain, urged that "it is important that our recent monetary action be understood not as a step in international contest or conflict, and not as a move to get a weapon in the scheduled international conversations. It was a measure required by circumstances and designed to enable us in this country to work out an improvement in prices which was essential. It may be hoped that other countries, by taking suitable monetary measures, will assist in producing the desired price improvement. The ultimate aim is to create a price condition under which the world can again be prosperous and not to seek any special American advantage."[1] Almost simultaneously with this statement there was issued the Joint Declaration by the President and Mr. MacDonald, which, though certainly minimising the place of currency stabilisation and the restoration of the gold standard in the programme of reform, did refer to them as ultimate objectives: co-operation between Central Banks and Public Works expenditure taking the first place.[2] Finally, in a message to the heads of States issued on May 16th, 1933, the President urged that the "World Economic Conference will meet soon and must come to its conclusions quickly. The world cannot await deliberations long drawn out. The Conference must establish order in place of the present chaos by a stabilisation of currencies, by freeing the flow of world trade and by international action to raise price levels. It must, in short, supplement individual domestic programmes for economic recovery, by wise and considered international action."

American policy at the World Conference, though tactically falling into two phases divided by an interval of time, is consistent throughout in its main outlines, so far as monetary policy is concerned—though this is not the same thing as saying that the policy, whatever it was, represented the views of the American delegation as a whole: it is, indeed, notorious that it did not.[3] The Agricultural Adjustment Act, containing the Inflation Amendments, had been passed on May 12th; between April and May the price index for farm products (1926 = 100) rose from 44·5 to 50·2, common stocks rose from 48 to 63: the average of the £ sterling had risen from

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[1] *F.C.C.*, April 29th, 1933, p. 2843.

[2] "Central Banks should by concerted action provide an adequate expansion of credit and every means should be used to get the credit thus created into circulation. Enterprise must be stimulated by creating conditions favourable to business recovery, and governments can contribute by the development of appropriate programmes of capital expenditure. The ultimate re-establishment of equilibrium in the international exchanges should also be contemplated. We must, when circumstances permit, re-establish an international monetary standard which will operate successfully without depressing prices and avoid the repetition of the mistakes which have produced such disastrous results in the past. In this connection the question of silver, which is of such importance in trade with the East, was discussed, and proposals were tentatively suggested for the improvement of its status." *F.C.C.*, April 29th, 1933, p. 2846.

[3] Though very much still remains obscure, it is now clear that Mr. Hull and his group at the Conference were not in full sympathy with the inner circle of the President's advisers and the latter group won. For what follows cf. Pasvolsky, *Current Monetary Issues*, pp. 60-91, and, especially, E. K. Lindley, *The Roosevelt Revolution*, especially pp. 182-217.

$3·57 in April to $3·93 in May, and it was not illegitimate to suppose that, even if the dollar was undervalued at these levels, its *de facto* stabilisation would reverse the tendency for prices to rise. In any event, the President first vetoed the proposals which had been discussed by the representatives of Treasuries and Central Banks—this was on June 22nd—on the ground that "temporary stabilisation would be untimely . . . the American Government feels that its efforts to raise prices are the most important contribution it can make.[1]" The second and more important blow was delivered when President Roosevelt rejected, on July 3rd, in a historic message, the Joint Declaration which called for the ultimate restoration of the gold standard, and proposed, as a temporary expedient, the maintenance of the ruling gold parity in the "gold bloc" countries, and joint measures limiting exchange speculation by all countries, whether upon the gold standard or not.[2] The Presidential message of July 3rd rejected the "specious fallacy of achieving a temporary and probably an artificial stability in foreign exchange on the part of a few countries only": argued that "the sound internal economic system of a nation is a greater factor in its well-being than the price of its currency in changing terms of the currencies of other nations," and went on to the enunciation of the concept of the commodity dollar: "let me be frank in saying that the U.S. seeks the kind of dollar which a generation hence will have the same purchasing and debt-paying power as the dollar value we hope to attain in the near future. That objective means more to the good of other nations than a fixed ratio for a month or two in terms of the pound or franc."[3] This line of argument might have been effective against the plans for a preliminary stabilisation such as that proposed by the meeting of Treasury and Central Bank representatives: it had no relevance to the ideas of the gold bloc, and had nothing to do with the content of the resolution against which it was nominally directed. Backed as it was by a further American statement of July 5th, stressing even more emphatically the interest of the delegation in "American commodity prices," and repudiating "any immediate concern" with "the value of the dollar in terms of foreign currencies,"[4] the effect was necessarily to encourage the fall in the dollar and the rise in internal stock and commodity prices. For some time to come the commodity dollar—interpreted as a return to the price level of 1926—held the centre of the stage: it seemed almost inevitable that the President would have to make use of the powers conferred on him by the Agricultural Adjustment Act if nothing else would serve. In the short run, however, the Administration could rely upon its action being anticipated by the speculator, who would thus serve the purposes of the Administration and yet be repudiated if the necessity for moral admonition were to arise. At the end of May, brokers' loans to the N.Y. Stock Exchange stood at $529 millions: they rose to $780 millions and $916 millions by the end of June and July respectively. The index of farm products stood at 53·2 in the week ending June 24th; by July 22nd they had reached the level of 62·7; the dollar quotation for sterling was (monthly average) $4.14 in June and $4.65 in July. The pace was too hot; on July 19th a reaction set in.

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[1] Cited Pasvolsky, *op. cit.*, p. 70. [2] Cited Pasvolsky, p. 81. [3] Cited Pasvolsky, p. 83.

[4] *Op. cit.*, p. 85. This statement is presumably that referred to by Mr. Lindley *op. cit.*, pp. 213-14, as the "Keynes-Lippmann-Moley Statement": for Mr. Moley "gets (presumably on July 4th) Keynes and Lippmann together at the American Embassy, and they work until 3.30 the following morning drafting a supplementary statement of the American position designed to draw together all the nations outside the gold bloc."

(*d*) *Towards a free Gold Market*

The attempt to mobilise all gold in the U.S. had been partly, but not entirely, successful. On August 28th, 1933, a new Executive Order was issued, followed on September 12th, 1933, by new Treasury gold regulations.[1] Part I of the Order required returns, under oath, to the Secretary of the Treasury by owners of "gold coin, gold bullion or gold certificates," except on the part of owners of gold held under licence, the Federal Reserve Banks and owners protected by various minor exemptions. Explanation had to be furnished as to what transactions required the holding of such gold, etc., "and a statement explaining why such transactions cannot be carried out by the use of currency other than gold certificates." Sec. 4 of Part I prohibited, after the date of the Order, any acquisition of gold coin, bullion or gold certificates except under licence, subject to certain exceptions. Sec. 5 laid it down that "after thirty days from the date of this Order no person shall hold in his possession, or retain any interest, legal or equitable, in any gold coin, gold bullion or gold certificates situated in the U.S. and owned by any person subject to the jurisdiction of the

So far as I am aware, not one word about this curious piece of international co-operation appeared in the British Press at the time.

[1] *F.R.B.*, October 1933, p. 599 *et seq.*

U.S. except under licence. . . ." Lastly, Sec. 6 of Part I forbade ear-marking or export except under licence. So far as this part of the Order was concerned (with the possible exception of Sec. 4) nothing essentially new was introduced: Part II of the Order, however, created a " free gold " market in the U.S., so far as newly mined gold was concerned. It gave the Secretary of the Treasury power to receive, " on consignment for sale, subject to such rules and regulations and upon such conditions as he shall prescribe, gold recovered from national deposits in the U.S. or any place subject to the jurisdiction thereof. Sales may be made (*a*) to persons licensed to acquire gold for use in the arts, industries or professions, or (*b*) by exports to foreign purchasers. Such sales shall be made at a price which the Secretary shall determine to be equal to the best price obtainable in the free gold markets of the world after taking into consideration any incidental expenses such as shipping costs and insurance. Such sales shall be made through the Federal Reserve Banks or such other agents as the Secretary may from time to time designate and shall be subject to such charges as the Secretary may, from time to time, in his judgment determine. . . ."

The policy thus announced was, of course, an open admission of the fact that the old mint price was a deterrent to gold production and was a clear imitation, so far as the mining industry was concerned, of the British gold policy. It represented a victory for the Committee for the Nation, which had been pressing for this policy for some months: but I am not sure that the true significance of the policy lies in its technical aspect. I am inclined to think that it marks the ascendancy of the point of view which was to dominate American policy after October, i.e. the view that a rising dollar price for gold was in itself a factor forcing the American price level upwards. In the short run, of course, the possibility of selling gold abroad meant that the dollar was likely to rise, rather than fall, in terms of other currencies, since it gave U.S. exporters foreign balances which they could sell in the N.Y. foreign exchange market. Clearly the dollar price which the U.S. Treasury could pay would move with the external value of the dollar in the first instance: the initial price (September 8th), was $29.62 per fine ounce: it rose to $32.28 on September 20th, and on October 24th, just before the Reconstruction Finance Corporation took charge, stood at $29.80.

(*e*) *The Revival of Discontent*

Whatever motives may have led to the policy of the free gold market, it is certain that in the summer and early autumn of 1933 the American Government had other and more pressing problems as its major preoccupation: the set-back in mid-July which was imperilling the success of the entire Recovery programme: and, particularly, the success of the policy of raising agricultural prices, upon which so much turned if the President's prestige with the farmers were not to collapse disastrously. The mid-Western situation was dangerous; no less so was the position in the South. The policy of deliberately destroying part of the oncoming cotton crop of 1933-4 had not succeeded in keeping prices up: the result was the revival, in an acute form, of inflationary proposals. On September 18th there took place, under the ægis of important political representatives of the "cotton states," a representative meeting which addressed the following appeal to the President:[1]

> "We respectfully petition you . . . immediately to take steps for the inflation or expansion of the currency, which power was granted to you by the last Congress to meet just such emergencies as now exist: that such a step is immediately necessary for the recovery of the price of cotton and all other farm products and to restore the buying power of the farmer:
>
> "To bring about an immediate increase in the commodity prices we suggest and recommend that you use the power conferred to issue and place in circulation U.S. notes. In support of such recommendation and petition we call your attention to the following facts:
>
> "The Nation in an emergency in the 'sixties, authorised, issued and placed in circulation some $400,000,000 in U.S. notes. Such notes, although not based on interest-bearing bonds, were, in fact, based upon all the property and taxing power of the Government, and that of the said $400,000,000 worth of said notes, the sum of $346,000,000 of such notes are still in active circulation. We call your attention to the fact that through the issuance of such non-interest-bearing notes, the people to date have saved the total sum of over $11,000,000,000 in interest alone."

Whatever one may think of the scientific value of the theories upon which such resolutions were based, their political significance is obvious. It is impossible to go into the non-monetary measures taken to relieve the situation, e.g. the creation of the Commodity Credit Corporation, but the relation between agrarian discontent and the next step taken by the Administration is clear enough, whatever influence may additionally have been exercised by the views of the Committee for the Nation and Messrs. Warren and Pearson. Up to the end of October, the implicit assumption of the U.S. Government had been that a depreciating exchange would of itself raise prices. A new and more startling theory was now put forward. The first period of experimentation was over.

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[1] *F.C.C.*, September 23rd, 1933, p. 2145.

III. Price Inflation Through Gold Purchases

(a) *The President's Speech of October 22nd*, 1933[1]

In a broadcast speech on October 22nd the President reiterated that the objective of the Government since the previous March had been to " restore commodity price levels to . . . such a level as will enable agriculture and industry once more to give work to the unemployed . . . to make possible the payment of public and private debts more nearly at the price level at which they were incurred . . . gradually to restore a balance in the price structure so that farmers may exchange their products for the products of industry on a fairer exchange basis." Those who desired stability first were " putting the cart before the horse ": none could tell what the external value of the dollar should be: " to guess at a permanent gold valuation now would certainly require later changes caused by later facts." Once the required price level is restored " we shall seek to establish and maintain a dollar which will not change its purchasing and debt-paying power during the succeeding generation." But, " our dollar is now altogether too greatly influenced by the accidents of international trade, by the internal policies of other nations and by political disturbances of other continents. *Therefore*, the United States must take firmly in its own hands the control of the gold value of our dollar. This is necessary in order to prevent dollar disturbances from swinging us away from our ultimate goal, namely the continued recovery of our commodity prices. . . ."

If this passage means anything at all, it implies that the external value of the dollar was being sustained above the equilibrium point by the " flight " from other currencies. In fact, there is considerable reason to suppose that the dollar was undervalued and that—apart from anticipation—it would have been higher than it actually stood when the President made his speech. It is, of course, unfortunately the case that a currency divorced from a fixed base will fluctuate in value, but it was intended that it should, otherwise it would have been considered desirable to give it a *determinate* gold content. That this is the last thing which in reality the President at that time desired follows from the subsequent sentences of his address:[1]

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[1] *F.C.C.*, October 28th, 1933, p. 3033.

> "Therefore, under the clearly defined authority of existing law, I am authorising the Reconstruction Finance Corporation to buy gold newly mined in the U.S. at prices to be determined *from time to time* after consultation with the Secretary of the Treasury. . . . *Whenever* necessary to the end in view *we shall buy or sell gold in the world market.* My aim in taking this step is to establish and maintain continuous control. This is a policy and not an expedient. It is not to be used merely to offset a temporary fall of prices. We are thus continuing to move towards a managed currency."

The principle to which the U.S. was thus committed was that a rising dollar value for gold would swing the U.S. price level upwards. Since neither the "sterling club" nor the U.S. itself was upon the gold standard, there was no *a priori* reason whatever for expecting such a result: on the contrary, raising the dollar value of gold could legitimately be expected merely to accentuate the undervaluation of the dollar, and thus, as a final consequence, through increased pressure on the international price level, bring about results in direct opposition to those desired by the President.

(*b*) *The Implementation of the Policy*

On October 25th a new Executive Order was issued, followed by Treasury Regulations of the same date.[2] The Order revoked that of August 29th, 1933, and by Sec. 3 laid it down that

> "The Reconstruction Finance Corporation is authorised, subject to such regulations as from time to time may be prescribed by the Secretary of the Treasury, to acquire gold

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[1] Italics mine.

[2] *F.R.B.*, November 1933, p. 674 *et seq.*

> which has been received on consignment by a United States Mint or Assay Office and to hold, ear-mark for foreign account, export or otherwise dispose of such gold."

On the previous day a Committee had been appointed by the President to fix the price at which the R.F.C. should acquire gold newly mined in the United States. An announcement was made on October 25th that the R.F.C. would accept subscriptions in newly mined gold for its ninety day debentures at the rate of $31.36 per ounce of fine gold.[1] But it is, of course, obvious that a rise in the dollar price of *domestic* gold could not possibly exert any influence upon the *external* value of the dollar. Doubts upon this aspect of the problem were not removed until October 29th. It was announced that "an informal meeting at the White House" had taken place, the subject of discussion being "the immediate setting up of machinery under which the Government, through the R.F.C., will be enabled to buy gold in foreign markets." Three days afterwards it was announced that the Reconstruction Finance Corporation "had authorised the Federal Reserve Bank of New York to dispose of the notes of the Corporation and take in payment foreign gold imported after November 1st, 1933."[2]

It may be as well to give here the history of this experiment so far as the mere facts are concerned. On October 25th, the R.F.C. price was $31.36. Thereafter the price was pushed up by some 14 cents a day until it reached $33.56 on November 14th. On November 21st, it reached $33.76: on the 28th $33.85 and on the 29th $33.93. Between December 1st and December 16th, it stood at $34.01: from the 18th onwards to January 15th it stood unaltered at $34.06 per fine ounce. On January 16th the price stood at $34.45, but by that time the experiment was at an end: and the new price was fixed under circumstances differing radically from those under discussion in this section.

(*c*) *The Emergence of Organised Opposition*

Within a month of the inauguration of the new policy, the internal situation had undergone a profound change. The U.S. Treasury as well as the U.S. State Departments were, in part, at any rate, staffed by personalities not in sympathy with the currency policy of the Administration. Even before the announcement of the new policy, it was clear that Senator Carter Glass, the legislative father of the Federal Reserve Act, was opposed to the Administration on these issues. The Secretary of the Treasury was given indefinite leave of absence on the ground of ill health,[1] and the Under-Secretary of the Treasury, Mr. Dean G. Acheson, had resigned. But the real counter-stroke was delivered when Dr. O. M. W. Sprague, who had resigned his post at the Bank of England to become "Executive Assistant" to the Secretary of the Treasury, voluntarily vacated his post under date of November 16th, 1933: although his letter of resignation only appears to have been made public a few days later.[2] It was a brief but outspoken criticism of the recent policy of the Government: the policy pursued would not lead to a speedy rise of general prices "at a time when there is large excess plant capacity and millions of unemployed wage-earners." Moreover, "and of over-shadowing importance, the present policy threatens a complete breakdown of the credit of the Government." A wave of opposition to currency depreciation began to manifest itself: the U.S. Chamber of Commerce passed a strongly worded resolution, urging, *inter alia*, "that there be an immediate announcement of intention of an early return to a gold basis, with complete avoidance of monetary experimentation, greenbackism and fiat money and with complete recession from theoretical and arbitrary ideas of 'price index' fixation of the value of gold."[3] The opposition was also joined by Mr. James P. Warburg, who had acted as financial adviser to the American delegation to the World Economic Conference, and by a number of economists, including Professor Kemmerer of Princeton. Dr. Sprague was bitterly attacked by the Committee for the Nation, his attitude was described as "disloyal" and his behaviour during his term of office sharply questioned. The Secretary of the Treasury also criticised Dr. Sprague, as did Professors Irving Fisher and J. H. Rogers of Yale.[4]

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[1] *F.R.B.*, November 1933, p. 676.

[2] *Loc. cit.*, p. 678.

It is probable that these protests had less to do with the gradual cessation of the policy than the accumulating evidence that it was not working out successfully. The Bureau of Labour Index stood at 70·4 on October 21st, and at 71·7 on January 13th, just before the final abandonment of the policy.

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[1] *F.C.C.*, November 18th, 1933, p. 3591.

[2] Text in *F.C.C.*, November 25th, 1933, p. 3776.

[3] *F.C.C.*, November 25th, 1933, pp. 3775-6.

[4] *Ibid*, p. 3777.

Farm products had indeed risen from 54·2 to 58·6 between these two dates, but the net result was negligible,[1] when compared with a rise of nearly ten per cent. in the dollar value of gold. The policy was, in fact, gradually abandoned, as the movements in the gold price cited in section (*b*) above clearly show.[2]

IV. The De Facto Stabilisation of Gold

(*a*) *The Gold Reserve Act of* 1934

Just before the turn of the year, the perennial preoccupation with private gold hoardings led to the issue of yet another Treasury Order, that of December 28th, 1933.[3] The Order required every person subject to the jurisdiction of the U.S. to pay and deliver to the Treasurer of the U.S. forthwith "all gold coin, gold bullion and gold certificates situated in the U.S., certain specified cases alone being exempted, licensed gold, 'collector's' pieces, scrap and fabricated gold required for industrial, professional or ornamental use, gold owned by a Federal Reserve Bank or the Reconstruction Finance Corporation." Payment for such gold would be made in "any equivalent amount of any form of coin or currency coined or issued under the laws of the U.S., designated by the Secretary of the Treasury," and, naturally, at the mint price, since it was not a question here of newly mined domestic gold.

On January 31st, the President addressed a Message to Congress. The traditional "Annual Message" had dismissed problems of currency in a few words: "with the twofold purpose of strengthening the whole financial structure and of arriving eventually at a medium of exchange which will have over the years less variable purchasing and debt-paying power for our people than that of the past, I have used the authority granted me to purchase all American-produced gold and silver and to buy additional gold in the world market. Careful investigation and constant study prove that in the matter of foreign exchange rates, certain of our sister nations find themselves so handicapped by internal and other conditions that they feel unable at this time to enter into stabilisation discussions based on permanent and world-wide objectives."[4]

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[1] Weekly figures in *F.R.B.*, February 1934, p. 139.

[2] Gold bought under the Plan exceeded $75 millions, of which $21 millions approximately was newly mined domestic metal.

[3] *F.R.B.*, January 1934, p. 9.

[4] *F.C.C.*, January 6th, 1934, p. 19.

It was the wicked Europeans who were holding up the stabilisation of the dollar. The new message[1] was based upon the hope that " events are leading to some future form of general agreement," and on the view that the actual circulation of gold coin is quite unnecessary. It proposed, therefore, the transfer to direct Government ownership of the entire gold stocks of the U.S.A., not only the gold hitherto held by individuals, but also the gold held by the Federal Reserve System. Though the Government already possessed power to take over such gold, it was proposed to ask Congress for fresh legislation: such legislation would place " the right, title and ownership to our gold reserves in the Government itself: it makes clear the Government's ownership of any added dollar value of the country's stock of gold which would result from any decrease of the gold content of the dollar which may be *made* in the public interest. It would also . . . cast upon the Government the loss of such dollar value, if the public interest in the future should require an increase in the amount of gold designated as a dollar." Two positive statements followed:

With the mobilisation of gold " the time has come for a more certain determination of the gold value of the American dollar. Because of world uncertainties, I do not believe it desirable in the public interest that an exact value be now fixed. The President is authorised by present legislation [i.e. the Agricultural Adjustment Act] to fix the lower limit of permissible revaluation at 50 per cent.: careful study leads me to believe that any revaluation at more than 60 per cent. of the present statutory value would not be in the public interest. I therefore recommend to the Congress that it fix the upper limit of permissible revaluation at 60 per cent.

That we may be further prepared to bring some greater degree of stability to foreign exchange rates in the interests of our people, there should be added to the present power of the Secretary of the Treasury to buy and sell gold at home and abroad, express power to deal in foreign exchange as such. As a part of this power I suggest that, out of the profits of any devaluation, there should be set up a fund of $2,000,000,000 [*sic*] for such purchases and sales of gold, foreign exchange and Government securities as the regulation of the currency, the maintenance of the credit of the Government and the general welfare of the U.S. may require."

Within fifteen days of the date of this message the Gold

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[1] Printed in full, *F.R.B.*, February 1934, pp. 61-3.

Reserve Act of 1934 had been passed, not without opposition on the part of those who found in the proposal to set up a vast Equalisation Fund a direct threat to the position of the Federal Reserve System as the ultimate source of credit control in the U.S.A., especially as the Fund was given power to deal in Government securities.

The Act is a complicated measure of 19 sections. The following represents a summary of its main provisions:

1. It appropriates the gold stock of the Federal Reserve System to the Treasury, which is to pay for it by means of special Treasury balances. " Balances in such amounts shall be payable in gold certificates, which shall be in such form and such denominations as the Secretary of the Treasury may determine."

2. It provides for amendments of the Federal Reserve Act in such a way as to make a holding of gold certificates valid in all cases in which gold was formerly required to be held.

3. It provides for the regulation by the Secretary of the Treasury of the acquisition of gold for internal consumption purposes, and for the acquisition of gold by the Federal Reserve Banks " for the purpose of settling international balances."

4. The coinage of gold, and the payment or delivery of gold coin by the U.S. Government, is to cease. Gold coins are to be withdrawn from circulation, and, together with all other Government-owned coin, shall be formed into bars " of such weights and degrees of fineness as the Secretary of the Treasury may direct."

5. U.S. currency ceases to be redeemable in gold except under Treasury regulation and except for gold certificates owned by the Federal Reserve System to the extent necessary " to maintain the equal purchasing power of every kind of currency of the U.S." The reserve against greenbacks, Treasury notes of 1890 and gold certificates " shall be maintained in gold bullion equal to the dollar amounts required by law and the reserve for Federal reserve notes shall be maintained in gold certificates, or in credits payable in gold certificates maintained with the Treasurer of the U.S."

6. No redemption in gold shall be made except in gold bullion "bearing the stamp of a United States Mint or Assay Office equivalent at the time of redemption to the currency surrendered for such purpose."

7. The profit from revaluation, if and when taking place, should be carried into the Treasury as a "miscellaneous receipt."

8. The Secretary of the Treasury to have the right to buy "gold at home and abroad . . . at such rates and upon such terms and conditions as he may deem most advantageous to the public interest."

9. The Secretary of the Treasury to be given power to establish an exchange equalisation fund, which is to be created with an endowment of \$2 billions out of the profits of revaluation.

> "The fund shall be available for expenditure under the direction of the Secretary of the Treasury and in his discretion, for any purpose in connection with carrying out the provisions of this section, including the investment and reinvestment in direct obligations of the U.S. of any portions of the fund which the Secretary of the Treasury, with the approval of the President, may from time to time determine are not currently required for stabilising the exchange value of the dollar."

Sec. 10 (*c*) of the Act lays it down that the life of the fund is for a maximum period of two years from the date of enactment, unless the President "by proclamation recognising the continuance of the emergency," extends its life for not more than one additional year.

Lastly, the inflation amendments of the Agricultural Adjustment Act are amended by the addition of two paragraphs: the first fixing the maximum weight of the dollar at sixty per cent. of the old amount: the second increasing the President's powers to deal with silver and silver coinage (including power to reduce the weight of the standard silver dollar by the same percentage as the weight of the gold dollar is reduced).

Executive action followed immediately.[1] A Presidential proclamation of January 31st fixed the weight of the gold dollar at $15\frac{5}{21}$ grains nine-tenths fine,[2] notice being given that the President reserves "the right by virtue of the authority vested in me to alter or modify the proclamation as the interest of the United States may require." The Secretary of the Treasury announced his willingness to buy gold (1) newly mined in the U.S. or (2) imported at the rate of \$35 per fine troy ounce "less the usual mint charges and less $\frac{1}{4}$ of 1 per cent. for handling charges" and (3) to sell gold "to persons licensed to acquire it for use in the industries, professions or arts, but not more than is required for a three months' supply for the purchaser." The price was $35 per troy ounce, plus ¼ of 1 per cent. Two supplementary notices appeared. The Secretary announced his willingness, until further notice, "to sell gold for export to foreign central banks whenever our exchange rates with gold standard currencies reach gold export point. Like the purchases, all such sales of gold will be made through the Federal Reserve Bank of New York as fiscal agent of the U.S. . . ." at $35 per fine ounce plus ¼ per cent. handling charge. On February 1st, 1934, the Secretary announced that the New York Reserve Bank would buy imported fine gold bars "and other gold, foreign or domestic, through any United States mint or the United States assay offices at New York or Seattle . . ." at $35 per fine ounce and the handling charge above mentioned.

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[1] *F.R.B.*, February 1934, pp. 67-70; pp. 81-8.

[2] $15\frac{5}{21}$ grains = 59·06 per cent. of the old gold content of the dollar of $25\frac{8}{10}$ grains.

The wheel had come full circle: without anyone quite realising it, the United States was back upon a *de facto* gold standard.

(*b*) *The Aftermath of the Gold Reserve Act*

Once the country was back upon gold the rates of exchange with gold standard countries would have to accommodate themselves to the new mint price of gold; until they did so, gold would either flow in, if the dollar-franc rate left a profit on buying gold in Paris and selling it in New York, or flow out, if the dollar-franc rate left a profit on buying gold in New York and selling it to the Bank of France. So far as Great Britain was concerned, a double movement was possible: either the rate of exchange could alter, or the London price of gold could vary. The price of gold in London did in fact rise from 133s. 1d. on January 31st to 140s. on February 5th: thereafter it fell. Cables on New York were selling at $4.97¼ to $5.03½ on January 31st: as the rate of exchange altered, the price of gold varied in the opposite direction. The franc rate gradually adjusted itself to the new gold points, but the process of adjusting the exchanges was accompanied by an immense gold drain to the U.S.A. In January, there was still a net export of gold: thereafter the tide turned, so that between February 1st and March 7th (that is, in five weeks) some $505 millions moved to America.[1] Thereafter the stream began to decline, as it was inevitable that it would, once the Paris-New York rate, the London-Paris rate and the London gold price had become adjusted to the new situation.

The *de facto* stabilisation of the dollar, of course, left the issue of its undervaluation in terms of relative price levels unaffected: nor were any of the possibilities of further currency experimentation excluded by the action taken in January. All that had happened was that the policy of raising prices by exchange depreciation was, for the moment at any rate, brought to an end. It remains to be seen whether the pressure of political and economic forces will drive the U.S. in the direction of reopening the whole question of the future of its currency, or whether any action taken will be such as is consistent with the maintenance of the existing relationship with gold. What is, however, certain is that with the passage of the Gold Reserve Act one chapter of American currency history has been closed: that, namely, which began on the very day upon which the President assumed office.

Geneva, April, 1934.

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[1] 1st - 7th	February,	1934	$ mills.	1·2
8th-14th	,,	,,	,,	47·2
15th-21st	,,	,,	,,	204·6
22nd-28th	,,	,,	,,	129·7
1st - 7th	March,	,,	,,	124·7

Figures from the *F.C.C., passim.*

STATISTICAL APPENDIX—I

	U.S.A. Gold Prices.	*London Gold Prices.*	*U.S.$ in Paris.*	*U.S.$ in London cables.*
	(*a*) *Treasury Prices*			
1933				
Sep. 8th.	29.62 per fine oz.			
9th	29.12			
11th	29.10			
12th	29.21			
13th	29.48			
14th	29.77			
15th	30.41			
16th	30.49			
18th	31.44			
19th	31.64			
20th	32.28			
21st	31.33			
22nd	31.75			
23rd	31.75			
25th	31.30			
26th	31.49			
27th	31.35			
28th	31.05			
29th	31.33			
30th	31.46	133/1	65.4	4.75¼ @ 4.77¾
Oct. 2nd	31.88	133/5	64.5	4.77½ @ 4.80½
3rd	32.12	134/8	64.5	4.78½ @ 4.79¾
4th	31.79	134/-	64.6	4.76⅛ @ 4.77⅛
5th	31.55	133/8½	65.1	4.73 @ 4.75¾
6th	31.72	133/11	64.9	4.73 @ 4.75⅜
7th	31.20	133/4	66.3	4.69 @ 4.70¼
9th	31.14	133/1	66.0	4.68½ @ 4.69⅝
10th	31.26	133/9	65.9	4.69¼ @ 4.69⅝
11th	30.91	133/1½	66.8	4.65¼ @ 4.67⅜
12th	holiday	133/5	holiday	holiday
13th	30.62	132/10½	67.7	4.54 @ 4.63¼
14th	29.83	131/3	69.8	4.55⅛ @ 4.58
16th	29.00	128/6	69.6	4.49⅝ @ 4.55½
17th	29.86	130/11½	68.8	4.55¼ @ 4.59½
18th	30.33	132/0½	68.4	4.62 to 4.50½
19th	29.18	129/11	70.4	4.50½ @ 4.55⅝
20th	29.13	129/0½	71.0	4.50¾ @ 4.54⅛
21st	29.01	128/6	71.2	4.51½ @ 4.53⅜
23rd	29.59	129/2	69.6	4.60 @ 4.64⅝
24th	29.80	128/1	69.1	4.66½ @ 4.78¼
	(*b*) *R.F.C. Prices*			
25th	31.36	130/-	66.6	4.74 @ 4.79
26th	31.54	130/9½	66.8	4.73¼ @ 4.75⅞
27th	31.76	131/2	67.0	4.70¼ @ 4.72⅞
28th	31.82	129/8	67.4	4.70⅞ @ 4.72⅞
30th	31.96	131/2½	65.9	4.72½ @ 4.80⅜
31st	32.12	130/7	66.4	4.76 @ 4.78
Nov. 1	32.26	131/9	65.3	4.78⅞ @ 4.80⅜
2nd	32.36	133/6	64.2	4.82¼ @ 4.86

	U.S.A. (R.F.C.) Gold Prices (cont.)	*London Gold Prices (cont.)*	*U.S. $ in Paris (cont.)*	*U.S. $ in London cables (cont.)*
1933				
Nov. 3rd	32.57 per fine oz.	133/2	64.9	4·84⅜ @ 4·85⅞
4th	32.67	132/4½	64.6	4·85¾ @ 4·86⅜
6th	32.84	131/10	64.9	4·88 @ 4·91⅛
7th	32.84	129/11½	63.27	holiday
8th	33.05	131/10	63.5	4·92½ @ 4·98⅛
9th	33.15	130/11	63.02	5·01¼ @ 5·15
10th	33.20	129/8	61.9	5·10½ @ 5·16⅛
11th	33.02	130/1½	62.04	5·04 @ 5·10¼
13th	33.45	129/1½	62.3	5·13⅝ @ 5·13⅜
14th	33.56	128/7	60.9	5·20⅞ @ 5·33½
15th	33.56	129/0½	59.8	5·30¼ @ 5·42
16th	33.56	128/6	58.5	5·28¼ @ 5·52¾
17th	”	128/2	61.2	5·15⅛ @ 5·33⅜
18th	”	128/2	61.7	5·24 @ 5·25
20th	33.66	127/7	61.0	5·27⅞ @ 5·33⅜
21st	33.76	127/-	60.7	5·34¼ @ 5·44
22nd	”	126/6	60.6	5·44 down to 5·39
23rd	”	125/8	61.4	5·27 @ 5·37¼
24th	”	126/1	63.0	5·13½ @ 5·30¼
25th	”	126/6	63.5	5·19 @ 5·20⅝
27th	”	125/3½	64.9	5·07 @ 5·17½
28th	33.85	125/6	63.4	5·07 @ 5·20⅝
29th	33.93	125/6	63.0	5·17¼ @ 5·25¼
30th	holiday	125/1½	holiday	holiday
Dec. 1st	34.01	125/2	63.7	5·16¾ @ 5·25⅛
2nd	”	124/11½	64.0	5·16 @ 5·18¾
4th	”	124/8	65.1	5·04¼ @ 5·15
5th	”	125/6	63.4	5·08¾ @ 5·19
6th	”	126/11	63.7	5·10¼ @ 5·16⅛
7th	”	126/-	64.0	5·09½ @ 5·13
8th	”	126/9	63.6	5·11¼ @ 5·16⅝
9th	”	126/6	63.4	5·15½ @ 5·17½
11th	”	127/-	63.5	5·08⅝ @ 5·15⅝
12th	”	126/4½	64.5	5·04 @ 5·11
13th	”	126/1	65.2	5·03 @ 5·07⅛
14th	”	126/1	64.2	5·05¾ @ 5·12⅝
15th	”	126/1	63.7	5·10 @ 5·15
16th	”	126/4	63.8	5·11½ @ 5·13⅞
18th	34.06	126/9	63.2	5·13½ @ 5·17¼
19th	”	126/11	63.5	5·13¼ @ 5·15⅝
20th	”	126/11	64.6	5·08⅜ @ 5·12⅛
21st	”	126/2	64.4	5·07½ @ 5·09⅞
22nd	”	126/3	64.0	5·09¾ @ 5·12
23rd	”	126/5	64.0	5·10¾ @ 5·11½
25th	holiday	holiday	holiday	holiday
26th	34.06	holiday	63.3	5·14⅝ @ 5·15⅞
27th	”	126/5	63.8	5·10 @ 5·13⅛
28th	”	126/3	64.3	5·07⅝ @ 5·09⅞
29th	”	126/2	64.3	5·07½ @ 5·08⅞
30th	”	126/-	63.1	5·12¼ @ 5·16¼
1934				
Jan. 1st	holiday	holiday	holiday	holiday
2nd	34.06	127/-	63.3	5·14¾ @ 5·18¼

	U.S.A. (R.F.C.) Gold Prices (cont.)	*London Gold Prices (cont.)*	*U.S.A. $ in Paris (cont.)*	*U.S.A. $ in London cables (cont.)*
1934				
Jan. 3rd	34.06 per fine oz.	127/6	62.9	5.11⅝ @ 5.16½
4th	”	127/1	63.4	5.08 @ 5.16
5th	”	127/1	63.7	5.09⅛ @ 5.13
6th	”	126/11	63.8	5.11¼ @ 5.12¼
8th	”	126/8	64.2	5.07⅜ @ 5.09⅝
9th	”	126/8½	64.2	5.08¼ @ 5.10⅜
10th	”	127/1	64.1	5.08⅜ @ 5.10¼
11th	”	127/1	64.0	5.08½ @ 5.10¼
12th	”	127/2	64.0	5.08½ @ 5.09⅛
13th	”	127/2	63.7	5.09 @ 5.09⅞
15th	”	128/6	62.6	5.11¾ @ 5.16⅜
	(*c*) *F.R. Prices*			
16th	34.45	131/9	62.2	5.08 @ 5.12⅝
17th	”	131/6	62.0	5.03⅛ @ 5.08½
18th	”	132/10	62.6	4.94¾ @ 5.00⅞
19th	”	132/10	62.6	5.01⅛ @ 5.03⅞
20th	”	132/9	62.9	4.99½ @ 5.02½
22nd	”	132/11	62.4	4.99⅝ @ 5.02½
23rd	”	132/9	62.3	5.00⅛ @ 5.01⅛
24th	”	132/10	62.6	4.98 @ 5.01½
25th	”	132/1	62.9	4.96¼ @ 4.98
26th	”	132/8	63.5	4.93¼ @ 4.96¼
27th	”	132/3	63.0	4.95⅜ @ 4.98½
29th	34.45	132/5½	62.8	4.98¼ @ 5.03
30th	”	132/10	62.0	5.00 @ 5.03½
31st	”	133/1	62.6	4.97¼ @ 5.03½
Feb. 1st	35.00	135/6	62.8	4.96½ @ 5.01½
2nd	”	139/6	62.8	4.87⅜ @ 4.94½
3rd	”	138/3	Range 6.18¼ to 6.46	4.90⅞ @ 4.95
5th	”	140/-		4.93⅜ @ 4.95
6th	”	139/3		4.96 @ 4.97½
7th	”	136/6		4.98⅜ @ 5.03½
8th	”	136/9		5.00¾ @ 5.02¼
9th	”	137/4		5.01½ @ 5.02½
10th	”	137/1	Range 6.46¾ to 6.54¾	5.02½ @ 5.03⅛
12th	”	137/2		Holiday
13th	”	136/11		5.03⅛ @ 5.04
14th	”	137/5		5.03¼ @ 5.03½
15th	”	137/5		5.03⅝ @ 5.06
16th	”	136/4		5.08 @ 5.09½
17th	”	135/10	Range 6.51 to 6.56¼	5.09⅝ @ 5.10⅝
19th	”	134/9		5.13½ @ 5.14½
20th	”	135/9		5.04¼ @ 5.09⅜
21st	”	136/5		5.07¼ @ 5.09⅛
22nd	”	136/1		Holiday
23rd	”	136/5½		5.07½ @ 5.08
24th	”	136/6	Range 6.55¾ to 6.58½	5.07⅝ @ 5.08
26th	”	136/5		5.08¼ @ 5.08⅝
27th	”	136/7		5.06½ @ 5.08½
28th	”	137/1		5.06⅜ @ 5.06¾
March 1st	”	137/1		5.06¾ @ 5.08
2nd	”	136/7		5.07½ @ 5.08¼

	U.S.A. Gold Prices (F.R.) (cont.)	*London Gold Prices (cont.)*	*U.S.A. $ in Paris (cont.)*	*U.S.A. $ in London cables (cont.)*
1934				
Mar. 3rd	35.00 per fine oz.	136/10½	Range 6.57½ to 6.58½	5.07½ @ 5.07¾
5th	„	136/10		5.06¾ @ 5.07¼
6th	„	137/2		5.06¾ @ 5.07¾
7th	„	136/10		5.07½ @ 5.08⅞
8th	„	136/8		5.07⅝ @ 5.08⅝
9th	„	136/10		5.07½ @ 5.08⅝

APPENDIX II

GOLD IMPORTS AND EXPORTS, 1934

	U.S. Gold Imports and Exports (million $)	
Date.	*Imports.*	*Exports.*
Dec. 28th-Jan. 3rd ...	—	.2
Jan. 4th-Jan. 10th ...	—	.2
Jan. 11th-Jan. 17th...	—	1.3
Jan. 18th-Jan. 24th...	—	1.7
Jan. 25th-Jan. 31st ...	—	.05
Feb. 1st-Feb. 7th ...	1.2	—
Feb. 8th-Feb. 14th ...	47.2	—
Feb. 15th-Feb. 21st...	204.6	—
Feb. 22nd-Feb. 28th	129.7	—
March 1st-March 7th	124.7	—

"The Theory of Unemployment" by Professor A. C. Pigou

By R. G. Hawtrey

In this analytical study of the theory of unemployment, Professor Pigou is breaking new ground. The treatment of the subject is predominantly mathematical, and he explains in his Preface that what he has studied "is a simplified model of the economic world rather than that world itself in its full completeness. Neither our analytic apparatus nor our statistical information is at present adequate for that." No one will find fault with him for giving his results to the world while they are still, as he says, "tentative in character." Economists will be glad to have the opportunity of becoming acquainted with his methods and results at this stage.

"It is possible," he says, "to study the problem of unemployment either from the money end or from what I shall call, in contrast, the real end. The two studies, if made complete and carried through correctly, must necessarily come to the same thing, their analyses meeting in the middle." He has chosen to start from the "real" end, and "to bring in the monetary factor only at a fairly late stage."

After some preliminary chapters, Professor Pigou embarks upon the development of his subject in Part II, the Short-Period Elasticity of the Real Demand for Labour. Here he investigates "the differences or variations, in quantity of labour demanded that are associated with given differences, or variations, in the rates of real wages for which workpeople stipulate, *when the relevant demand functions for labour are given*" (p. 33).

The starting point of the investigation (p. 41) is the principle that at any centre (apart from monopoly conditions) "the quantity of labour demanded there at any given rate of real wage is such that the value in terms of wage-goods of its marginal net product (i.e. of the difference made to the total physical yield by the marginal man with the help of existing equipment) approximates to that rate of wage" (wage being defined to include employers' contributions to social services).

In the case of an industry which buys materials, applies a process to them, and sells the finished product, we may suppose that x units of labour yield y units of processing. If $\psi(y)$ be the demand function for the finished product and $f(y)$ be the supply function of the raw material, $\frac{d\psi}{dy}$ will be the demand price of the finished product ("at works") and $\frac{df}{dy}$ the supply price of the raw material.

Then the demand price of labour "in terms of wage-goods" will be:

$$w = \left(\frac{d\psi}{dy} - \frac{df}{dy}\right)\frac{dy}{dx} = \frac{d\psi}{dx} - \frac{dx}{df}.$$

The elasticity of the demand for labour will be :

$$\frac{w}{x\,\frac{dw}{dx}}.$$

Expanded, this yields what Professor Pigou calls an ungainly formula. But an elegant and ingenious transformation finds a significance for all the second differential co-efficients contained in it in terms of elasticity of demand for the finished product, and for units of processing, and of elasticity of supply of raw material, etc. (pp. 43-4).

This is the method of approach on the mathematical side to Professor Pigou's investigation. It is open to criticism in several respects.

In the first place, the assumption that the rate of wage is equal to the marginal net product is only true if the employer asks for no contribution whatever towards net profit and overhead expenses from the output of the marginal man. Professor Pigou's assumption is that it will be worth while to employ additional labour, dx, at a cost of $w dx$, so long as the selling value, $\frac{d\psi}{dy}dy$, of the additional output exceeds the cost of materials, $\frac{df}{dy}dy$, by at least $w dx$. The limit at which no more labour will be engaged is therefore reached when

$$w\,dx = \frac{d\psi}{dy}dy - \frac{df}{dy}dy, \text{ or } w = \frac{d\psi}{dx} - \frac{df}{dx}.$$

But, in practice, the limit will be reached earlier. The employer will not increase his output beyond the point at which $\frac{d\psi}{dy}dy - \frac{df}{dy}dy$ exceeds $w\,dx$ by an appropriate margin of gross profit, $K\,dy$.

Thus the formula should be:

$$w = \frac{d\psi}{dx} - \frac{df}{dx} - K\frac{dy}{dx}.$$

K is not simply a function of y, the output; it depends on a variety of other circumstances, and particularly upon the prospects of future business.

In Professor Pigou's formula, K is zero. That does not mean that the margin between costs and the proceeds of sale is zero. This margin, in fact, is equal to $y\left(\frac{d\psi}{dy} - \frac{df}{dy}\right) - wx$. But it is a quasi-rent, different in character from profit, whether gross or net. Indeed, if $\frac{dy}{dx}$ is greater than $\frac{y}{x}$, it will be a negative quantity.

If gross profits were assumed to be a constant proportion of the wages bill, Professor Pigou's equations could be employed with very little alteration. We should have $K\,dy = kw\,dx$, where k is a constant, and

$$(1 + k)w = \frac{d\psi}{dx} - \frac{df}{dx}.$$

In fact, $(1 + k)w$ could take the place of w wherever it occurs.

But Professor Pigou does not suggest such a formula. And it would in reality be no improvement, except in its formal recognition that gross profits exist. For the fundamental importance of gross profits in the theory of the demand for labour arises from the very fact that the proportion of profit on the marginal output is *not* constant.

In introducing his formula, Professor Pigou says that the variation in output is to be "with existing equipment," and that "the differences in the quantity of wear-and-tear suffered by equipment and in the costs of non-manual labour employed, that are associated with differences in output, are ignored as being, in general, of secondary importance" (p. 42).

It is quite legitimate to assume that in the short period an increase in employment involves no increase in overhead expenses. But even when that is so, it is quite unwarrantable to assume that the employer will be content to receive *no contribution* towards overhead expenses from an increment of output. When his concern is employed much below capacity, he will be content with an inadequate contribution ; he will reduce the margin of gross profit below the usual percentage, and he may in an extreme case reduce it to nothing. As the concern becomes more fully employed, he will increase the percentage. When the industry as a whole is very active, the percentage will rise above normal. But it is not solely on the actual output that the percentage depends. Even when underemployed, a producer will be reluctant to make big price concessions if he thinks that the orders so obtained will prevent him from taking more remunerative orders in the near future.

Professor Pigou takes account of " monopolistic policy, whether in the guise of formal agreement or of tacit understanding or of a general refusal without any understanding, to sell down to prime cost " (p. 135). But he supposes these " shifts towards monopoly," securing a margin above prime cost, to take place " predominantly in times of low demand for the commodity," and the shifts towards competition, securing no such margin, to be characteristic of good times. That is the direct contrary of the facts.

Gross profits interpose a cushion between variations in the proceeds of sale of the product and variations in costs. They profoundly modify the demand for labour and greatly reduce its elasticity. Professor Pigou recognises that " normal capacity for any occupation means the rate of output [at] which the equipment is designed to yield at least average supplementary *plus* prime cost per unit " (p. 50). But even if when he points out that in a highly-capitalised industry the marginal output is relatively high, he means that marginal output *exceeds the rate of wages*, that does not lead him to correct his mathematical formula.

From time to time in the course of his book, he refers to the effects of booms and depressions on elasticity. " In times of boom, owing to the limitation of fixed capital equipment, it is not, in general, feasible to push employment further except at the cost of sharply decreasing physical returns. . . . It is impossible for the real demand for labour in terms of wage goods to be other than highly inelastic. In times of depression, however, when the bulk of a country's capital equipment is working much below capacity this is not so " (p. 89).

The point here is not that the state of activity or depression affects the gross profit aimed at by the employer, but simply that at a time of activity labour cannot profitably be engaged in excess of the numbers to which the capital equipment is adapted. In that case there will, no doubt, be an increased gross profit, owing to the failure of output to keep pace with demand. But the admission of this exception to the marginal productivity formula is very far from a recognition of the vital importance of gross profits to the general theory.

" Any study of elasticity," we are told, " which disregards the distinction between booms and depressions *must* be futile " (p. 89). It would have been more to the point to say that any study of elasticity which neglects the effects of variations in gross or net profits on the behaviour of employers *must* be futile.

Professor Pigou, in his Preface, describes his book as " strictly academic in tone and content." It is " addressed to students of economics." That being so, he can quite legitimately include in his investigations hypothetical cases, which are quite detached from practical affairs, and are of value either for their purely intellectual interest, or as examples of method, or as exercises for students. But, when he does so, he ought to *state the hypothesis*. And when he jumps straight from an abstract formula of this character to an application to existing conditions (usually chosen Britannocentrically from this country) he exposes himself to the suspicion that he is not fully aware of the limited character of his own assumptions.

The equation $w = \left(\frac{d\psi}{dy} - \frac{df}{dy}\right)\frac{dy}{dx}$ deals with the labour employed in " processing," to the exclusion of that employed either in marketing and transporting the finished product, or in producing the materials. Thus $\frac{d\psi}{dy}$ is the price of the finished product " at works." With regard to the subsequent operations of marketing and transport, " for purposes of a rough approximation we may postulate that the proportion of the total value contributed by the cost of these services remains constant " (p. 46). But commerce and transport are themselves sources of employment. Even in countries where they are much less important than " processing," they are far from negligible.

Marketing and transport should more properly be regarded as *subsequent processes*. And the production of materials and intermediate products are likewise sources of employment, and should be regarded as *prior* processes. Professor Pigou treats materials as affecting employment in the industries which use them, and seems to have forgotten the labour employed in producing them (p. 122). He does indeed mention them as examples of complementary industries, " wherever one industry produces something that is used as material or machinery for the work of another, an element of complementariness is present " (p. 67), but he does not pursue the matter further.

We should be closer to the facts if we regarded any finished product as the outcome of a series of economic activities, each stage buying the output of the one before. If the cost of the output of the r^{th} stage, bought by the $r + 1^{th}$ stage, be $f_r(y)$, and the labour employed at the r^{th} stage be x_r and the rate of wage w_r, Professor Pigou's formula could be generalised into:

$$w_r \frac{dx_r}{dy} = \frac{df_r}{dy} - \frac{df_{r-1}}{dy}.$$

If we insert a term K_r for gross profit on the marginal product it becomes:

$$w_r \frac{dx_r}{dy} + K_r = \frac{df_r}{dy} - \frac{df_{r-1}}{dy}.$$

At the *first* stage, where a primary product (whether organic or mineral) is derived direct from the soil, we have $f_0 = 0$.[1] At the last stage, where the finished product is sold to the final purchaser, $\frac{df_r}{dy} = \frac{d\psi}{dy} =$ the price to the final purchaser.

If we sum all stages from first to last in a single equation, we get simply:

$$\Sigma w_r \frac{dx_r}{dy} + \Sigma K_r = \frac{d\psi}{dy}.$$

Price is reduced to the sum of the cost of labour and the gross profit for all stages, without the cost of materials appearing explicitly anywhere.

When Professor Pigou reaches his formula for the demand price of labour, he states it to be " in terms of wage-goods." And throughout the book " wage-goods " are employed as a standard for the comparison of real wages with other values.

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[1] This is not literally correct. There will probably still be some purchases of materials (such as seed and fertilisers, or explosives or pit-props).

Wage-goods are the goods on which wages are spent, and therefore compose the real remuneration of the workpeople. It is very natural, when approaching the subject from the " real " end, to assume all values to take the form of " prices " expressed in wage-goods as a standard.

It is explained in Part I, Chapter IV, how the measurement of an aggregate of wage-goods depends on a system of weighting in an index number. The upshot is that " changes of real wage-rates are incapable of exact measurement."

" When, between two dates, there has occurred any sensible change in the proportions in which the representative wage-earner buys different sorts of wage-goods, the term, a unit of wage-goods, has no exact meaning " (p. 20).

It would seem to be a distinct drawback to the approach of the subject of unemployment from the " real " end, that all values have to be expressed in terms of units which have " no exact meaning." In reality, however, Professor Pigou need not have complicated his formula by bringing wage-goods into it at all. The employer is not concerned with the real remuneration of his workmen, but only with the relation between the exchange value of the wages and the exchange value of his own product. If " reality " necessarily means barter conditions, and we have to imagine that the employer undertakes to supply his workmen with the goods they want to consume, then the employer will, of course, be very directly interested in wage-goods. But for the purposes of an analysis of the demand for labour, it is sufficient to assume that the functioning of markets results, directly or indirectly, in the establishment of a definite ratio between wages and the exchange value of the product in each industry. We need take no account of any medium to serve as a common unit for them. When we have expressed the value of wages in wage-goods and the value of the product in wage-goods, we proceed to calculate the value of wages in terms of the product, and then the wage-goods drop out. We could equally well make the calculation in terms of *anything possessing a market value*. It might be sealing-wax or tame lizards, or (if that were not too extravagant a departure from reality) it might be money.

Professor Pigou limits the generality of his analysis unnecessarily when he makes it non-monetary. The static relations between output and employment do not depend either on the inclusion or on the exclusion of money.

When we come to Part III, which deals with movements of the real demand for labour, we can still assume the mutual ratios between wages and products to be determined by markets, without expressing them in terms of any common medium. But here we do need some measure which will enable us to say whether wages are or are not " changing " or " resisting change." That is essential, because it is only through *the resistance of wages to change* that a variation in the demand for labour affects employment at all. " With perfectly free competition among workpeople and labour perfectly mobile . . . there will always be at work a strong tendency for wage-rates to be so related to demand that everybody is employed. The implication is that such unemployment as exists at any time is wholly due to the fact that changes in demand conditions are continually taking place, and that frictional resistances prevent the appropriate wage adjustments from being made instantaneously " (p. 252). Professor Pigou points out that in practice this implication requires to be qualified, for wage-policy may be aiming at wage-rates which are not consistent, even in stable conditions, with full employment. Whenever that is so, wage-policy is itself a cause of unemployment.

The " frictional resistances," however, are themselves a part of wage-policy. The system of demand functions is always in process of change. " Wage policy, even though its general tendency and intention is constant, cannot adjust itself instantaneously to each momentary state of this process " (p. 272).

Throughout Part III, Movements of Real Demand, Professor Pigou assumes that real wages, that is to say wages in terms of wage-goods, remain unchanged. Implicitly that means that the inertia of wage policy is directed to keeping real wages unchanged.

Any such assumption is quite out of accord with the facts. In Part V, The Causation of Unemployment, Professor Pigou discusses the factors of inertia that interfere with the appropriate adjustments of wages, and proceeds:

" These factors of inertia, which, in an economy where wage-rates were always contracted for in kind, would tend to keep real wages stable in the face of changing demand, in a money economy tend to keep money wages stable. To a great extent people—employers and employed alike—think in money. . . . If the conditions of real demand were stationary, and known to be stationary, and the only variable factor was the quantity of money available for expenditure, the custom of basing wage contracts for long terms on a cost-of-living sliding scale might, after a time, win wide acceptance." But as things are, there are obstacles to this practice, and " thus, except in periods of very violent price oscillations, employers in general fight strongly against upward movements in money rates of wages and workpeople against downward movements. Money wage-rates show themselves in practice highly resistant to change " (pp. 294-5).

In fact, wage agreements relate to money wages, and the resistance which causes unemployment in case of a change in the demand for labour is a resistance to a change in money wages.

Wage-goods are introduced into the analysis because Professor Pigou, having chosen to approach his subject from the " real " end and not from the " money " end, is precluded from attaching the inertia of wage-policy to money wages, and he therefore attaches it to real wages. But the result is to vitiate all the reasoning based on that assumption in its practical application to a monetary economy. In this respect it is not true to say that the two methods of approach " must necessarily come to the same thing, their analyses meeting in the middle." The investigator approaching the subject from the " real " end, who proceeds on these lines, will find that he must retrace his steps.

But the precise character of the inertia of wage-policy could have been perfectly well left undetermined till the introduction of the monetary mechanism permitted it to assume concrete form. Had that course been followed, the purchasing power of wages need never have come into the analysis, and wage-goods need never have been mentioned.

Perhaps it may be objected that, when we have to compare the general level of wages at different times, or on different hypotheses, we must have some standard of comparison. In Part II, Chapter IX, there is an investigation of the elasticity of demand for labour as a whole. The formula for the demand price of labour *in one industry*, $w = \left(\frac{d\psi}{dy} - \frac{df}{dy}\right)\frac{dy}{dx}$, can be interpreted as relating w, a rate of wages, directly with $\frac{d\psi}{dy}$, the value of the product, $\frac{df}{dy}$ the value of the materials, and $\frac{dy}{dx}$, the marginal productivity of labour. There need be no intervening standard of value to supply a common measure, for all these quantities must, in any case, be assumed to have determinate mutual ratios.

But when we generalise the formula and find an expression for marginal productivity, $w = \frac{dF}{dx}$, where w is the average wage level, x is all the labour employed in the community, and F is the total output, we look for some standard of comparison between w, x, F on the one side and any different position, $w + dw$, $x + dx$ and $F + \frac{dF}{dx}dx$, or w', x' and F', on the other. Wage-goods supply such a standard.

But in reality the introduction of the standard, while facilitating the mathematical expression of the formula, constitutes a limitation of its generality. The facts to be summed up in it are those relating to particular industries ; each wage rate is linked to its own product by the appropriate productivity function, and the demand for the product is governed by the appropriate demand function. The functions relating to the several products are not all independent of one another, but that does not mean that any simple formula can be found to express the elasticity of demand for labour in general in relation to wages in general.

Professor Pigou (pp. 89-90) divides the labour employed in the community into x men engaged in producing wage goods and y men engaged otherwise, and infers that if $F(x)$ is the output of the former, the general rate of wage will be $\frac{dF}{dx}$ for *both* classes of labour. That rate being applied to the non-wage-good industries, y may be regarded as a function of x.

But it is a mistake to suppose that the real wages of those engaged in producing wage-goods can be thus equated to their marginal output. For the weighting of the different kinds of wage-goods in the marginal output, $\frac{dF}{dx}$, is quite different from the weighting required to compute real wages. Wage-goods include some products which are predominantly consumed by the working classes, but they must include others of which the proportion so consumed is very small. And every gradation will be found between those for which the proportion is 80 or 90 per cent. and those for which it is 1 or 2 per cent. Little is to be gained by segregating the products for which the proportion is *nil*, and excluding them from the marginal productivity function which determines the general rate of wages.

The boundary line between wage-goods and non-wage-goods is not a very significant one. By adopting a more minute subdivision of products, so that differences of quality constitute different products, we can extend the list of non-wage-goods. Cigars, wireless sets, seats at the theatre, are wage-goods, but the more expensive qualities in each case might be separated off and classed as non-wage-goods. In making the classification, what we have to discover in the case of each product is whether any part of the output, however small, is ever consumed by the wage-earners. But for a product for which we know that the working-class consumption in any case does not exceed a very small proportion, the question whether that proportion is, or is not, absolutely nothing is quite unimportant. We might neglect such cases and count as non-wage-goods all those for which the proportion is below an arbitrary limit, say 5 per cent., but we should still find that the difference between 80 per cent. and 5 per cent. is much more significant than the difference between 5 per cent. and *nil*.

In fact, if we wish to explore the reaction upon real wages of a change in the productivity of any industry or group of industries, what we want to know is not whether these industries are wage-good industries or not, but what proportion of the output of each enters into wage-earners' consumption, and what proportion of that consumption it represents.

Wage-goods are relevant to wages as *incomes*. An investigation of unemployment or of the demand for labour is concerned with wages as *costs*.

Wage-policy is a link between the two. Wages as costs may be determined by a wage-policy which is influenced by wages as incomes. But, as we have seen, wage-policy is not, for the most part, guided by real wages.

Professor Pigou builds his theory on wage-goods from the foundation. "When the real rate of wage stipulated for is given, the quantity of labour demanded in the aggregate of all industries varies, and can only vary, in precise proportion to the quantity of wage-goods available for, and devoted to, the payment of wages" (p. 143). At the beginning of the book he elaborates a formula, in which he reckons out the wage-goods available, whether from new production, from importation or from stocks, and deducts the wage-goods consumed by non-wage-earners, and the net amount transferred by non-wage-earners to the wage-earning classes otherwise than in wage-payments (old age pensions, etc.). If the quantity so arrived at be divided by the average rate of real wages, the result is the amount of employment. This is a proposition "not of economics, but of arithmetic" (p. 24). And a proposition of arithmetic it must remain in any world in which employers do not remunerate their workmen with wage-goods, and workmen do not formulate wage-policy in terms of wage-goods.

The manner in which wage-goods enter into the analysis throughout the book may be illustrated by the following passage, relating to the effects of an improvement in productivity in a particular wage-good industry:

"If the demand in terms of wage-good units for the product of that industry has, over the relevant range, an elasticity greater than unity, an improvement in productivity will increase the quantity of labour demanded in the industry, and will also increase the output of this particular wage-good item. This item consequently becomes cheaper in terms of other wage-good items. That fact, since it implies an increase in the value of every other wage-good item in terms of wage-good units, will make it worth while for employers, at a given real wage-rate, to engage more men in other wage-good industries. The quantity of labour demanded there will, therefore, increase. Moreover, there being a larger total of wage-good units in being, and, therefore, a larger surplus available to non-wage-earners, these persons will, in general, devote more wage-goods than before to setting labour to work in non-wage-good industries. . . .

"It is possible, however, that the non-wage-earners' attitude towards the particular item of wage-goods is such that the demand for it in terms of wage-good units has an elasticity less than unity. In this case the quantity of labour employed upon it will decrease in consequence of an improvement. . . . None the less, however, the output of the commodity must be increased" (p. 167).

All this would be very important if the condition that the real wage-rate is given were fulfilled. It is only within twenty pages of the end of the book that the reader encounters the fatal disclosure that it is money wages and not real wages that resist change. How much of the ingenuity devoted by Professor Pigou to his investigation, before that final stage, has been misdirected!

In any theory of movements in the real demand for labour it might be supposed that international trade and international competition would be given great prominence. Professor Pigou has something to say of the interdependence of the demand for labour in different centres, and refers very cursorily to the tendency of wage reductions in any centre to spread to competing centres (pp. 69-70), and to the increased demand for labour likely to result from the improved efficiency of export industries (pp. 169-71). But he never deals with the adverse effect on employment of the improved efficiency of foreign competitors in the export market.

He is chiefly interested in international trade as a means of exchanging non-wage-goods for wage-goods:

"In so far as additions to exports consequential upon a reduction in wage-rates are offset by additions to imports of foreign securities or of non-wage-goods that do not compete with native products, the industries that make them are, from the present standpoint, on a par with industries that make non-wage goods for home consumption. But in so far as they are offset by additions to imports of wage-goods or of raw materials, the industries that make them are on a par with home wage-good industries. An expansion in them indirectly promotes an expansion in the demand for labour in home non-wage-good industries. *Per contra*, in so far as additions to exports involve additions to imports that compete with the products of home non-wage-good industries, the demand for labour in those industries is affected adversely" (p. 76).

Part IV brings Professor Pigou to the consideration of monetary factors. Their exclusion from the earlier parts "does not mean that our analysis has assumed the monetary mechanism to be non-existent and so [has been] relevant, not to the actual world, but only to an abstract and unreal simulacrum of it. On the contrary, everything that has been said has been relevant to the actual world" (p. 185).

Professor Pigou builds the monetary section of his theory of unemployment on a "standard monetary system." This supplies a norm, somewhat like that which some economists find in " neutral " money, though Professor Pigou disavows any purpose of finding a system " under which economic life will proceed as it would do if there were no money at all " (p. 188).

He defines " the standard monetary system as one so constructed that, for all sorts of movements in the real demand function for labour or in real rates of wages, whether they last for a long time or a short, the aggregate money income is increased or diminished by precisely the difference made to the number of workpeople (or other factors of production) at work multiplied by the original rate of money wages " (pp. 205-6).

The standard monetary system is thus defined in terms of the aggregate money income. Its essential characteristic would seem to be that, whenever employment is increased or diminished by a non-monetary cause, the aggregate money income will be increased or diminished in proportion to the factors of production at work. The definition presupposes some relation between the rate of wages paid to the workpeople and the rates of remuneration of the other factors of production, profit, salaries, interest and rent. Such a relation is definite enough under equilibrium conditions, when, on the average, normal profits accrue after all the appropriate overhead expenses have been duly met. But when equilibrium is disturbed, and the margin increases or diminishes, how is the appropriate rate of remuneration of the profit-makers to be reckoned ? When employment is increased or diminished, how are we to measure the increase or decrease in the amount of services rendered by the profit-makers, regarded as a factor of production ?

Even at this stage of his subject Professor Pigou cannot resist the allurements of wage-goods. He proceeds to a further explanation of the standard monetary system : " In order that money income shall vary in correct accord with variations in the quantity of factors of production at work, industrialists in times of boom must only obtain money for engaging more labour to the extent that they and the people from whom they borrow abstain from spending money on wage-goods and imported non-wage-goods, and in like manner in times of depression, in so far as industrialists invest less money in hiring labour, they or other people must spend correspondingly more money upon wage-goods and imported non-wage-goods " (p. 211).

What is the relation between this explanation and the original definition of the standard monetary system ? The clue is to be found in an illustration which precedes the definition (pp. 204-5). For the sake of simplicity, we may neglect the imported non-wage-goods, which are introduced only because they are regarded as taking the place of a potential supply of wage-goods.

In this illustration Professor Pigou supposes a certain quantity of wage-goods to be diverted from consumption by non-wage-earners, and to be applied to hiring labour for the production of non-wage-goods. "The money concomitants of the real movement work themselves out as follows. Non-wage-earners . . . pay out to new wage-earners an amount of money, withdrawn from purchasing wage-goods . . . sufficient to enable them to buy the wage-goods that represent their real wages; money wage-rates and prices remaining the same as before. If W is the real rate of wage, K the number of additional workers employed, and P the money price per unit of wage-goods, . . . the aggregate money income of the community is increased by KWP."

But under actual monetary systems the course of events is usually different, "in that the extra money handed to wage-earners is not balanced against an equal contraction in the expenditure of non-wage-earners upon wage-goods for their personal consumption." When there is an upward movement, total money income is increased by substantially more than KWP; and when there is a downward movement, it is decreased by substantially more than this.

The definition of the standard monetary system is intended to represent it as the system which avoids these disproportionate movements of money incomes. The definition is generalised so as to take account not merely of additional workmen, but of additional "factors of production."

Where, then, is the significance of wage-goods? The additional incomes are of all kinds, and may be spent on all kinds of goods. The money obtained for engaging more factors of production will have to be offset by a reduction of expenditure not on "wage-goods and imported non-wage-goods" but on *any* goods.

The principle that emerges seems to be that the additional working capital required should be provided *out of income*, and therefore not by a creation of bank credit or by drawing on existing cash balances.

Of his illustration, which I have quoted above, Professor Pigou says: "Nothing has occurred to alter the size of the stock of money, M. Therefore, since income per unit of time has increased from I to $(I + KWP)$, . . . it follows that v, the former income velocity of the total money stock, has increased to v_2, where $v_2 = \frac{I + KWP}{I} v$ " (p. 205).

Nevertheless, when he has reached his general definition, he points out that the new wage-earners will accumulate cash balances out of their increased incomes, and " in order that this may happen, it is necessary that the stock of active money shall be, in some measure, increased." We may apply the same reasoning to the other factors of production, and conclude that they will likewise need additional cash balances.

Thus the standard monetary system requires that, in case of increased economic activity, there be a monetary expansion to provide the desired increase of cash balances.

But that means that the additional working capital will *not* be found exclusively out of income. In order that the appropriate expansion of money incomes may be effected, a part must be provided by credit creation, and not by any abstention from expenditure on the part of non-wage-earners.

The standard monetary system is not put forward as the embodiment of an ideal monetary policy. Rather it is intended to be used as a *criterion* to distinguish monetary from non-monetary disturbances, monetary disturbances being those involving a departure from the standard monetary system.

Nevertheless, Professor Pigou does regard the departures from the standard monetary system as on the whole harmful. What the standard monetary system implies is that " if the real demand function [for labour] varies, money income will vary with it in a certain specified way and not otherwise. With monetary systems not of standard type, money income does vary otherwise than in this specified way. In consequence . . . disturbances of the real demand function for labour take place that would not take place with a standard monetary system, and disturbances which would have taken place in any event, though in certain circumstances they may be damped down, are, in general, aggravated " (p. 210).

This is further explained on p. 216. In case of an extension of demand for some product, industrialists will seek to borrow to extend their working capital. Unless the rate of bank interest is put up to the " proper " rate (that which just satisfies the needs of the standard monetary system) they will do so.

" But the banking system, so long as it acts on current principles and does not follow a deliberate policy of stabilisation, will not push up the actual rate of bank interest so high as this. For it is to its interest to lend more than usual when borrowers are offering better terms than usual. Hence, in the face of an upward movement in the demand for labour initiated on the real side, banking systems, as currently operated, always allow the actual rate of bank interest to rise less than the *proper* rate. In like manner, in the face of a downward movement, the banking system always allows the actual rate of bank interest to fall less than the *proper* rate."

This passage betrays a misconception of the working of banking systems " on current principles." Banks do not " lend more than usual when borrowers are offering better terms than usual." Their lending is regulated by their cash reserves. At a time when the pressure from borrowers is greater than usual, the banks will both lend more than usual in proportion to their reserves and also charge higher rates. But they charge higher rates *because* their loans exceed the appropriate proportion. And they will continue to take these and other measures to deter borrowers till they have reduced their loans to the required extent. The competitive banks can, of course, rectify their cash proportions when there is a central bank from which they can borrow. But they merely pass on the pressure to the central bank. So long as the central bank is subjected to excessive pressure from the competitive banks, it will maintain a high bank rate and other deterrent measures.

It is, therefore, the reserve position of the central bank that is the governing condition. If its gold reserve is deficient, credit restriction will be maintained, and any disturbance tending towards increased activity will be checked, while any disturbance tending towards diminished activity will be reinforced. If, on the other hand, the gold reserve is redundant, the central bank will relax credit, with the contrary result.

If, then, " current principles " mean the working of the gold standard as hitherto understood, it is not true to say that there is any tendency to aggravate disturbances of the demand for labour arising from non-monetary causes. The action of the banking system tends rather to override these disturbances and obliterate them.

Of course, in doing so, the banking system becomes an independent source of disturbances in the demand for labour. The standard monetary system is devised not only to avoid itself causing disturbances, but also to leave the field clear for the non-monetary disturbances.

Would it not be possible to retain the overriding power by which the banking system obliterates the non-monetary disturbances, without originating monetary disturbances on its own account?

" It is conceivable," we are told, " that for some country with a monetary system of non-standard type, events should so shape themselves that disturbances initiated on the side of money supply always exactly offset disturbances initiated on the real side, so that at every moment the *proper* rate of bank interest was actually established. In such a case a monetary system not standard in intention would be standard by accident" (pp. 221-2).

But such a system would not be standard at all. The standard system allows free scope to all non-monetary causes of unemployment. The suggested system would *counteract* them. In that respect it would be a great improvement on the standard system. Nor would it necessarily come into operation " by accident." It might do so by design. That would mean a modification of the working of the gold standard as hitherto accepted.

The standard monetary system has to meet every shrinkage of the demand for labour with a proportionate contraction of the money income of the community, and so allows the shrinkage of demand to take full effect in unemployment. If the money income of the community were *kept unchanged*, then, as soon as any part of the factors of production became unemployed, the demand in terms of money for the output of the factors of production remaining employed would be intensified, and this intensified demand would tend to restore full employment. A monetary policy which aimed at stabilising the aggregate money income of the community would thus tend to eliminate unemployment altogether, except when wage-policy raised money wages.

There are two distinct reasons why money should be of paramount importance in the theory of unemployment. One is that it is the rate of money wages that resists change. The other is that a monetary cause affects all branches of economic activity in the same direction at the same time, whereas a non-monetary cause only affects a particular industry or group of industries.

The non-monetary causes affecting the demand for labour are indicated in Part III, Chapter II: changes in demand for any product, changes in the productivity of labour and changes in the supply of raw materials (pp. 110-12).

The effects on employment in general of an intensification of demand in one industry are considered—from the "real" end—in Part III, Chapter IX. There Professor Pigou argues that, in so far as wage-goods are merely diverted from employing wage-earners in other industries, no additional employment will result. To increase employment, wage-goods must be withdrawn from the consumption of non-wage-earners, or from stocks, or they must be imported, or they must be diverted from unemployment benefit.

These possibilities he examines in detail.

The consumption of wage-goods by non-wage-earners is "highly stable," and "no substantial variations in the wage-fund" are likely to come from this source.

As to stocks of wage-goods, "owing to the high cost and the risks of loss involved in holding large stocks, their absorbing capacity is also narrowly restricted," and reactions here "are not in general important" (p. 147).

Imports may make a big contribution *to any one country*, but "booms and slumps are largely international in character, so that the whole world, rather than a single country, is the proper object of study. For the whole world, however, the item . . . is, as we have seen, nil" (p. 148).

As to unemployment benefit, nothing is available unless employment is *already assumed to be increased*. "For an employment-making policy that, if the unemployment fund does not help, will fail, that fund contributes nothing; but for a policy that, without its help, would succeed in some measure, it will provide the means of enlarging that success" (p. 151).

How limited, then, must the effect of a non-monetary disturbance of the demand for labour be![1]

In reality Professor Pigou is led by his pre-occupation with wage-goods to understate the effects of a non-monetary cause. Such a cause acting in a monetary economy will not be limited in its effect by the amount of wage-goods diverted. The workmen drawn into employment are paid with *money*, and if they cannot be supplied with wage-goods from stocks or from increased output, then the prices of wage-goods will rise, and real wages will fall. Or, if fewer workmen are employed and the demand for wage-goods falls off, prices will fall and real wages will rise.

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[1] It may be mentioned that the passages quoted above apply to the stimulation of the demand for labour through public works.

The effect on employment will thus be greater in each case than if real wages were prevented from varying. But even so, the effect of non-monetary causes remains far less important than that of monetary causes.

It is not that the monetary cause necessarily has an immediate effect on real wages. The change in real wages may be delayed, and, when it comes, may be limited. The monetary cause modifies the relation in every industry between the price of the product and wages *as costs*.

It would give a misleading impression if, after setting out at length the criticisms of principle that I have to make upon Professor Pigou's book, I said nothing of the many interesting passages and valuable investigations to be found in the detailed application of the theory. These will not by any means fail to appeal even to those who differ most profoundly from his theoretical outlook. I may particularly select for mention Chapters VI and VII of Part II, dealing with the interdependence of different centres, and Chapter V of Part V, dealing with uniform and non-uniform wage rates.

Note.—A printed *Corrigenda* slip has been prepared since *The Theory of Unemployment* first appeared, and will be supplied by Messrs. Macmillan and Co., St. Martin's Street, W.C.2, to any whose copy of the book does not already contain it.

The Economic Aspects of Copyright in Books[1]

By Arnold Plant
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1. If an economist needed encouragement or justification for devoting time to the consideration of the effects of copyright legislation on the output of literature, he might find it in the stimulating introduction which Professor Frank H. Knight has contributed to the reissue of his *Risk, Uncertainty and Profit*. " Having started out by insisting on the necessity, for economics, of some kind of relevance to social policy—unless economists are to make their living by providing pure entertainment or teaching individuals to take advantage of each other," he discusses the conditions of relevance of economics to social policy, and his " first and main suggestion " is that an " inquiry into motives might well, like charity, begin at home, with a glance at the reasons why economists write books and articles."[2] Direct monetary profit from the sale of what they write does not figure in Professor Knight's suggestive discussion of the motivation of economist-authors; although for three, if not four, centuries the advocates of property in the right to copy have argued as though book production were the conditioned response of authors, publishers and printers to the impulse of copyright legislation. An inquiry into the rationale of copyright seems therefore both worth while in itself and likely to prove of general interest among students of economics.

There is, of course, a special difficulty in discussing the subject of copyright, in that a writer has an unavoidable bias. How many of us approach the topic in the spirit evinced by H. C. Carey in his *Letters on International Copyright* ? " The writer of these Letters had no personal interest in the question therein discussed. Himself an author, he has since gladly witnessed the translation and republication of his works in various countries of Europe, his sole reason for writing them having been found in a desire for strengthening the many against the few by whom the former have so long, to a greater or less extent, been enslaved. To that end it is that he now writes, fully believing that the *right* is on the side of the consumer of books, and not with their producers, whether authors or publishers."[1] T. H. Farrer, at that time Permanent Secretary to the Board of Trade, found it necessary to observe, when reviewing the proceedings of the Royal Commission on Copyright in the *Fortnightly Review* (December 1878), that authors, who were the principal witnesses, are interested witnesses: "printed controversy is therefore, on the whole, one-sided." It is rather like relying on articles in the daily newspapers for views on the waste involved in Press advertising. Bias, and fear of bias, make an author's judgment on copyright a little unreliable. His readers must exercise particular vigilance.

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[1] Presidential Address to the London Economic Club, March 13th, 1934.

[2] London School of Economics Series of Reprints, No. 16, pp. xxv-xxvi.

2. *Book production without copyright*

A convenient approach to the whole subject is to try to visualise the organisation of production of books, which we select as a typical commodity for the purpose of this inquiry, in the absence of any sort of copyright provisions. We may define "the absence of copyright provisions" as the circumstances in which the buyer of a literary product is free, if he so desires, to multiply copies of it for sale, just as he may in the case of ordinary commodities. Would books be written in such circumstances, and would they be published? Would firstly authors, and secondly publishers, find it possible to make arrangements of a sufficiently remunerative kind to induce them to continue in the business of book production?

3. *The unpaid author*

It should be observed at the outset that part of the output of literature is written without thought of direct remuneration at all. There are authors—scholars as well as poets—who are prepared to pay good money to have their books published.

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[1] H. C. Carey: *Letters on International Copyright* (Preface to 2nd Edition. New York, 1868) and *The International Copyright Question Considered* (Philadelphia, 1872). Carey was at one time a publisher himself.

It is conceivable that their output is in some cases quite unaffected by demand conditions: so long as they can go on paying they will go on writing and distributing their books. There is secondly an important group of authors who desire simply free publication; they may welcome, but they certainly do not live in expectation of, direct monetary reward. Some of the most valuable literature that we possess has seen the light in this way. The writings of scientific and other academic authors have always bulked large in this class. Economists are relatively fortunate in serving a market which so frequently provides a margin above costs of publication for the remuneration of the author; their colleagues in other faculties are usually only too pleased to secure publicity for their contributions to our literary heritage without financial subsidy from themselves. Publications are, of course, in varying degree essential for their careers, in professions other than that of authorship. They seek recognition of their claims as scholars; and published work they must have, even at the cost of paying for it. Speak to them on the subject of direct immediate return, and they reply in terms of numbers of off-prints or " separates." In just that way were authors quite generally paid in this country in the sixteenth century: they sold their manuscript outright to the publisher for perhaps at most one or two hundred copies: on occasion a little money might also pass.

For such writers copyright has few charms. Like public speakers who hope for a good Press, they welcome the spread of their ideas. Erasmus went to Basle in 1522, not apparently to expostulate with Frobenius for daring to print his manuscript writings, but to assist the printer in the good work. The wider the circulation, the more universal the recognition the author would receive.

4. *The payment of authors without copyright*

What, however, of a third group of authors—the professional scribes, who write for their living? Whether they sell their writings to publishers, who buy them because they hope to sell copies, or whether they publish them direct, their living depends on the direct proceeds from their writing, and in both cases their receipts depend on the number of copies sold. Clearly, they—both author and publisher—would gain directly from the restraint of all reprinting that resulted in a diminished sale of their own copies. If the purchase of a copy ceased to carry with it the right to make further copies from it for sale, the author and original publisher might contrive to do much better for themselves, by the simple monopoly device of restricting the number of copies offered on the market. They would do still better if they were given the power to control also the supply of directly competing books, as early publishers had in this country. It goes without saying, of course, that that undoubted fact is not an adequate reason why the general public should give them either degree of monopoly power.

The belief has been widely held that professional authorship depends for its continued existence upon this copyright monopoly; or upon an alternative which is considered worse, viz. patronage. Even if that were true, it would still be necessary to show beyond reasonable doubt that professional authors were worth retaining at such a price as copyright. The output which monopoly alone can evoke is not normally regarded as preferable to the alternative products which free competition would allow to emerge. Patronage itself may not be wholly an evil. There seems to be no reason why a person who wants certain things written and published should not be at liberty to offer payment to suitable people to do the necessary work. If the task is uncongenial, some authors will need high remuneration, and others will no doubt decline any terms; but many a builder has been willing in the past to erect even monstrous dwellings for rich men who had their own ideas about architecture. Patronage has in the past provided us with some magnificent literature, music, pictures, buildings, and furniture. There have been patrons who have given artists a very free hand in their work. Civil servants, secretaries of commissions, lawyers and others have conceived it their normal duty to express in imperishable language the views of their employers, with whom they may personally have been in disagreement. To Macaulay, nevertheless, speaking in the House of Commons at the second reading of Serjeant Talfourd's Copyright Bill in 1841 (February 5th, *Hansard*, Vol. LVI), patronage was the only alternative to copyright; and it was so objectionable that it justified copyright. " I can conceive no system more fatal to the integrity and independence of literary men, than one under which they should be taught to look for their daily bread to the favour of ministers and nobles." . . . " It is desirable that we should have a supply of good books; we cannot have such a supply unless men of letters are liberally remunerated, and the least objectionable way of remunerating them is by means of copyright." . . . "The system of copyright has great advantages, and great disadvantages." . . . "Copyright is monopoly, and produces all the effects which the general voice of mankind attributes to monopoly." . . . "Monopoly is an evil." . . . "For the sake of the good we must submit to the evil; but the evil ought not to last a day longer than is necessary for the purpose of securing the good." . . . "The principle of copyright is this. It is a tax on readers for the purpose of giving a bounty to writers. The tax is an exceedingly bad one; it is a tax on one of the most innocent and most salutary of human pleasures; and never let us forget that a tax on innocent pleasures is a premium on vicious pleasures." But Macaulay nevertheless preferred copyright to patronage.

Is there no other alternative, in the absence of copyright? For the moment it will be sufficient to remark that professional writers *have* contrived in the past to secure a price for their product, in such circumstances, provided always that a market exists for it at all. And it must be borne in mind that copyright in a particular work cannot itself *create* a demand for the kind of satisfaction which that work and similar works may give, it can only make it possible to *monopolise* such demand as already exists. Ultimately there must be patrons among the public, whom the author must serve if he is to sell his product. In the early days, authors were sometimes curiously employed. Italian paper-makers in the fifteenth century integrated forward, and organised staffs of writers to work on their paper, in the hope of thereby making the market for their product more secure.[1] We are reminded of the present-day integrations of paper manufacturers and newspapers employing journalists. In the days of manuscripts there was never, so far as we know, any thought of author's copyright. Manuscripts were sold outright, the author knowing that the buyer might have copies made for sale; and the first buyer knew that every copy he sold was a potential source of additional competing copies. In selling copies, he would therefore exploit with all his skill the advantage he possessed in the initial time-lag in making competing copies. Moreover, copies of copies naturally fetched lower prices, for errors in transcription are cumulative; and the owners of original manuscripts could sell first-hand copies at special prices. They therefore received a more permanent margin from which authors could be paid. It was all very like the present-day trade in new fashion creations—the leading twenty firms in the *haute couture* of Paris take elaborate precautions twice each year to prevent piracy; but most respectable " houses " throughout the world are quick in the market with their copies (not all made from a purchased original), and " Berwick Street " follows hot on their heels with copies a stage farther removed. And yet the Paris creators can and do secure special prices for their authentic reproductions of the original—for their " signed artist's copies," as it were. Augustin-Charles Renouard, the writer a century ago of two important books on patents and copyright, quotes in his treatise *Des Droits d'Auteurs* (1838) an estimate that there were 10,000 manuscript copyists in Paris and Orleans alone at the time of the invention of printing. Booksellers were then middlemen between the buyers of copies and the copyists: it was in part a " bespoke " trade. Copying was not by any means confined to the existing stock of classical works by dead authors, for despite the copyists the age has left a legacy of literature of its own. Unprotected by copyright, publishers were able to pay their authors then, just as dress creators can pay their designers to-day.

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[1] See Putnam: *Books and Their Makers.*

Was this all altered by the invention of printing? In fact, the making of copies was regulated almost at once; but we know beyond any doubt that the reason was not to ensure that authors were better remunerated. The early history of book production in this country is most illuminating on this whole question, and it will be touched upon in a moment. For the present, it will suffice to observe that four centuries after the days of Caxton, many English authors were regularly receiving payment from publishers in a country which had no copyright law for foreign books. During the nineteenth century anyone was free in the United States to reprint a foreign publication, and yet American publishers found it profitable to make arrangements with English authors. Evidence before the 1876-8 Commission shows that English authors sometimes received more from the sale of their books by American publishers, where they had no copyright, than from their royalties in this country. From the economic standpoint it is highly significant that, although there was no legislative restraint on the copying of books published abroad, competition remained sufficiently removed from that abstract condition of " perfection," in which there could exist no margin between receipts and costs for the remuneration of authors, for " handsome sums " in fact to be paid. In the first place, there was the advantage, well worth paying for, which a publisher secured by being first in the field with a new book. To secure priority American publishers regularly paid lump sums to English authors for " advance sheets."[1] Secondly, there was a " tacit understanding among the larger publishers in America that the books published by one should not be pirated by another."[2] Each notified the other of arrangements he had made.[3] What of other publishers who might be tempted ? It was explained, thirdly, to the Royal Commission of 1876-8 " that the practice of all the great houses in America (there are some three or four large publishing houses with very great capital), if anybody publishes one of their books, is to publish a largely cheaper edition at any cost, and they would make any pecuniary sacrifice rather than not cut out a rival."[4] " Fighting editions " in the book-publishing trade served the same purpose as " fighting brands " in the cigarette business, " fighting ships " on the shipping conference routes, and " fighting buses " in post-war London passenger transport. Yet, fourthly, perhaps the most important check on the rival publisher, whose competing edition would in any case be late in the field, was the low-price policy which the American publishers adopted. American editions might cost one-half as much as the English issue; one quarter or even one-eighth of the English price was very frequent. In such circumstances, the American public enjoyed cheap books, the American publishers found their business profitable, and the English authors received lump sums for their advance sheets and royalties on American sales.[5]

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[1] E.g. Evidence of G. H. Putnam.

[2] Evidence, Professor John Tyndall, Question 5795.

[3] E.g. Evidence of G. H. Putnam.

[4] Evidence, Professor T. H. Huxley, Question 5610.

[5] E.g. Evidence of T. H. Huxley, Question 5610. " I myself am paid upon books which are published there : my American publisher remits me a certain percentage upon the selling price of the books there, and that without any copyright which can protect him." Also John Tyndall, Question 5775 : ". . . . I make an arrangement with my publishers . . . in New York, and they every year send me an account of their sales and allow me a certain percentage on the retail price of my books." Asked (Question 5791) if the percentage were as large as it would have been if he had had copyright in America, his answer was : " I cannot say, but I should be inclined to think so, because I am in the hands of a most high-minded publisher. I believe that I should gain no advantage by the copyright in America that I do not possess at present. But though I should be unaffected, on public grounds I hold that a copyright ought to exist."

Cf. also Herbert Spencer in a letter to *The Times*, September 21st, 1895, reprinted in *Various Fragments* (1900) : " For a period of thirty years, during which English

The significance of priority in the market, coupled with a suitable size of edition and a corresponding price policy, as a deterrent to competition is emphasised by an illustration. In an appendix to his book on *The Marketing of Literary Property*, published in 1933, Mr. G. H. Thring gives a number of accounts of the costs of book production. Taking his figures for a crown octavo volume of 288 pages, eleven point, twenty-nine lines per page, an edition of 1,500 copies would involve approximately £300 to cover all publishing costs, pay 10 per cent. to the author and leave a profit of 16⅔ per cent. to the publisher on all the costs, including royalty. That would mean an average wholesale price of 4s. per copy, and a retail price of say, 6s. If the book were a success, and there were no copyright law, a rival publisher might very probably come into the market with a larger and therefore cheaper edition which would deprive the author and first publisher of at least part of their anticipated receipts. They might, of course, lower the price as soon as success showed itself to them, and reprint at once on a larger scale, before competitors could formulate plans. A publisher who was more skilful in judging public taste might, however, have embarked in the first instance on an edition of, say, 3,000 copies, and if he calculated on receiving the same total amount of profit himself from the venture and on paying twice the previous total royalty to the author, the total sum involved might be about £382, or 2s. 9d. per copy wholesale, corresponding to (say) 4s. retail.[1] A price as low as that would surely make competitors hesitate before issuing,

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works had no copyright in America, arrangements initiated about 1860 gave to English authors who published with Messrs. —— profits comparable to, if not identical with, those of American authors."

[1] The relevant detail of the costs, based on figures of Mr. Thring, is :

	Edition of 1,500 *copies.*			*Edition of* 3,000 *copies.*		
	£	s.	d.	£	s.	d.
Composition	46	2	6	46	2	6
Machining	15	10	6	22	19	0
Paper	18	18	0	37	16	0
Binding	36	0	0	54	0	0
Brasses for cases ...	1	12	0	1	12	0
Jacket	12	11	0	13	3	0
Author's Corrections ...	6	0	0	6	0	0
Advertising	60	0	0	60	0	0
Postage, etc.	10	0	0	10	0	0
Royalties	40	0	0	80	0	0
Profit	50	0	0	50	0	0
	£296	14	0	£381	12	6

late in the day, the still much larger rival edition which would be necessary to make possible an appreciable *further* cut in price. If a competing edition were issued much more cheaply on poorer-quality paper and possibly unbound, it would more probably tap a new market than divert the old. The abolition of copyright need not therefore result in the complete abandonment of the business of book production either by publishers or by professional authors.

5. *The early days of copyright*

Our speculations will be made more fruitful if we pause to inquire for a few moments into the nature and effects of copyright regulations in this country.

The earliest records are hardly less enlightening than those of our own generation. Regulation began in Tudor times with the usual system of royal patents, conferring upon certain persons the monopoly of the right to print particular books or classes of books. The patent system was of course applied by a series of impecunious monarchs to all sorts of enterprise, but printing was a special case, in due time expressly exempted (together with the manufacture of armaments) from the Statute of Monopolies (21 James I, c. 3) of 1623. The printers did not fail to turn to their own advantage the determination of the Crown to control the output of the printing press. Many of the early patent grants were, in their prime, profitable monopolies; one, for example, comprehending all grammars in the Latin tongue, another the Bible, a third covering all dictionaries, a fourth all books on law, and so on. A specialist writer, confronted by a buyer's monopoly for his class of work, had little hope of early publication, still less of a profitable sale of his manuscript, if the monopolist had on his hands a large stock of a competing book already printed. After 1557, when the general control of the industry was entrusted to the Stationers' Company,[1] a comprehensive attempt was made at rationalisation in the interest of its members. Each printer's rights to print were registered by the Company, and rights were assignable by one member to another. Whenever exceptional profits attracted interlopers, the case against unregulated competition was argued by the

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[1] On the Stationers' Company see *A Transcript of the registers of the Company of Stationers of London*, 1554-1640 A.D., edited by Edward Arber, 1875. I am indebted for many of the references concerning this period to the researches of Miss M. Plant. I have modernised the spelling in quotations.

Company with a skill which our present-day trade associations hardly excel. Already in 1583 the report of Christopher Barker went to show that the patent monopolies were not what they had been. For instance, the " most profitable copy " in the country, a Latin grammar for children, carried fixed charges which left the printers little more than prime costs; " the printer with some greater charge at the first for furniture of letters, hath the most part of it always ready set: otherwise it would not yield the annuity which is paid therefor." Monopolies cut into each other: Barker himself had the patent for the Book of Common Prayer, but Master Seres had one for a psalter comprising the most-used parts—" where I sell one book of common prayer, which few or none do buy except the minister, he furnisheth ye whole parishes throughout the realm, which are commonly a hundred for one." Master Seres skimmed the cream. The industry already suffered from serious surplus capacity: " there are 22 printing houses in London, where 8 or 10 at the most would suffice for all England, yea and Scotland too." There were too many printers with narrowly specialised skill: " who do both know and confess that if privileges were dissolved they were utterly undone, having no other quality to get their living." And there were the interlopers, challenging the patent monopolies and making public collections for legal expenses: " of which company being five in number, one John Wolfe, now prisoner in the Clink, is the chief."

The era of the Star Chamber's decrees and censorship was a happy time for the members of the Stationers' Company. Compared therewith, confusion reigned as soon as the backing of the Star Chamber was removed by the Long Parliament in 1641, and the Company's petition of 1643 to Parliament for greater powers of regulation[1] was cunningly designed to make the flesh of an uncertain authority creep. " Too great multitudes of presses " set up by " Drapers, Carmen and others," were alleged to be in work, indiscriminately printing " odious opprobrious pamphlets of incendiaries." The ear of government thus attuned, the petition proceeds to business. Even members of the Company were ignoring property in copies, and if one complain he " shall be sure to have his copy reprinted out of spite." The copyright monopoly is " a necessary right to stationers; without which they cannot at all subsist." . . . " Property in copies is a thing many ways beneficial to the State, and different in nature from the engrossing, or monopolising some other commodities into the hands [of] a few, to the producing of scarcity and dearth, amongst the generality." The stationers then pass to a statement of the case for copyright which would not discredit an "economic adviser" to a modern publishers' association. The first consideration is that books are luxuries, the demand for which is elastic, and therefore monopoly cannot harm the public.

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[1] See Edward Arber, *op. cit.*, Vol. I.

> Books (except the sacred Bible) are not of such general use and necessity, as some staple commodities are, which feed and clothe us, nor are they so perishable, or require change in keeping, some of them being once bought, remain to children's children, and many of them are rarities only and useful only to a very few, and of no necessity to any, few men bestow more in Books than what they can spare out of their superfluities. . . And therefore property in Books maintained among stationers cannot have the same effect, in order to the public, as it has in other Commodities of more public use and necessity.

The second consideration is that copyright monopoly would result in more and cheaper books.

> A well-regulated property of copies amongst stationers, makes printing flourish, and books more plentiful and cheap; whereas Community (though it seems not so, at first, to such as look less seriously, and intentively upon it) brings in confusion, and many other disorders both to the damage of the State and the Company of Stationers also; and this will many ways be evidenced.

Their reasons recall the oscillation theory of modern specialists in the mysteries of perfect competition. Over-production would result from an absence of copyright:

> For first, if it be lawful for all men to print all copies, at the same time several men will either enviously or ignorantly print the same thing, and so perhaps undo one another, and bring in a great waste of the commodities . . .

and under-production also:

> Secondly, the fear of this confusion will hinder many men from printing at all, to the great obstruction of learning, and suppression of many excellent and worthy pieces.

Booksellers' risks and costs would increase:

> Thirdly, Confusion or Community of Copies destroys that Commerce amongst stationers, whereby by way of Barter and Exchange they furnish books without money one to another, and are enabled thereby to print with less hazard, and to sell to other men for less profit.

Even professional authors come in for consideration:

> Fourthly, Community as it discourages stationers, so it is a great discouragement to the authors of books also ; many men's studies carry no other profit or recompense with them, but the benefit of their copies; and if this be taken away, many pieces of great worth and excellence will be strangled in the womb, or never conceived at all for the future.

Copyright should pass to heirs and assigns without term:

> Fifthly . . . many families have now their livelihoods by assignment of copies . . . and there is no reason apparent why the production of the brain should not be as assignable . . . as the right of any goods or chattels whatsoever.

And finally, in view of the foregoing:

> 'Tis obvious to all, that (if we will establish a just regulation) foreign books must be subjected to examination, as well as our own, and that all such importation of foreign books ought to be restrained as tends to the disadvantage of our native stationers.

The case for copyright has rarely been stated as comprehensively as in this early petition. Parliament responded promptly with the requisite Ordinance of 1643 (virtually a re-enactment of an old Star Chamber decree), to which we owe at least the inspiration of John Milton's *Areopagitica* of the following year. Under the Commonwealth, political censorship was continued, and after the Restoration the office of Licenser was revived by an Act of 1662 (13 and 14 Car. II, c. 33) which was little more than a new version of the former ordinances. The Act expired in 1679, was renewed in 1685, continued again till 1692, and then re-enacted for two more years. It lapsed finally in 1694. Until then, the control of the Stationers' Company continued over all copyright, which had to be registered in its books; but thereafter its authority to restrain reprinting ceased.

6. *Competition, and the first Copyright Statute*

As we have seen, authors could expect little benefit to themselves from the patent system. The printer who enjoyed the patent right for a particular class of book had a buying monopoly for all manuscript books in that class, and authors were in his hands. Under the control of the Stationers' Company, as members began to compete among themselves for the right to issue new books, authors were gradually enabled to bargain with more success. In the seventeenth century some of them were in a position to sell the rights to publish only one edition of a stated number of copies; and cash payments, in addition to the delivery of the authors' copies, became more general. The bulk of the publishing business came into the hands of the London booksellers, who were, of course, members of the Stationers' Company. Their contact with the market made them good judges of books which would sell, and they could therefore offer better terms. On occasion they shared the risks in expensive publications by taking over stock from each other by exchange or purchase. It was at the end of the seventeenth century that competition from publishers and printers outside the Stationers' Company became really severe. The era of political and religious censorship was passing, and the Company could no longer interest the Government in the control of the new printing presses springing up throughout the country. The doctrine of perpetual copyright which the Company had endeavoured to establish, on the evidence of assignments registered in its books, began to be flouted on all sides by the country booksellers, particularly after the Licensing Act lapsed in 1694. The London booksellers made a series of unsuccessful attempts to secure new legislation, and it was not until the eighth year of Queen Anne that they secured the passage of the first Copyright Statute.

7. *The "perpetual copyright" question*

In view of the claims which the Stationers' Company had hitherto made, the terms of the Copyright Act of 1709-10 are significant. In the case of existing books, the Act gave the authors, or if they had transferred their rights (which, of course, they almost invariably had) the then proprietors, the sole right of printing them for twenty-one years and no longer. In the case of new books, the author was given the sole right of printing them for fourteen years from the date of publication, and, if then still living, for one further term of fourteen years. The penalty for pirating was forfeiture and a fine of one penny per sheet, the protection extending only to books registered at the Stationers' Company. It will be noticed how closely the Act followed the patent system for inventions, as preserved in the Statute of Monopolies of 1623. The London booksellers, who must by then have despaired of ever securing the perpetual copyright which at one time they had claimed, had no reason to oppose the grant, enforceable in the Courts, of fourteen years of monopoly power for every new book they bought outright, although some of them subsequently protested when they realised that the second period of fourteen years granted to authors who were still living was the author's property to sell again.[1]

Authors themselves were placed in a much better bargaining position. Their success depended upon individual popularity and reputation. As regards " bargaining power," they needed only to avoid committing themselves far ahead in any one contract, for if their books sold well they could rely on booksellers to bid up each other. The career of David Hume as an author well illustrates the position.[2] In 1739 at the age of twenty-eight he sold the rights to the first edition in two volumes of his first book, *A Treatise of Human Nature*, 1,000 copies to be printed, to John Noon, bookseller, for fifty guineas and twelve bound copies. A year later, the third volume, *A Discourse Concerning Morals*, was ready, and although Noon was very willing to take it Hume found it more profitable to contract with Thomas Longman, to whom Francis Hutcheson had referred him.[3] In subsequent years he issued several editions of his *Essays* through Kincaid, Donaldson, and ultimately the very astute London publisher, Andrew Millar. In 1754 we find him engaging with Edinburgh booksellers to publish 2,000 copies of the first volume of his *History of Great Britain* for £400; but Andrew Millar paid him £700 for the rights to one edition of the second volume, and the same for the subsequent section (in two volumes) on the Tudors. In 1759, twenty years after selling his first book, Hume contracted with Millar to write the early section of the *History*,

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[1] For an entertaining and informative account of this period see Augustine Birrell: *Seven Lectures on the Law and History of Copyright in Books.* (Cassell, 1899.)

[2] See *The Letters of David Hume,* edited by J. Y. T. Greig.

[3] Letter, March 4th, 1740, to Francis Hutcheson: The same bookseller " is very willing to engage for this, and he tells me that the sale of the first volumes, though not very quick, yet it improves. I have no acquaintance among these folks, and very little skill in making bargains. . . . There are two favours, therefore, I must ask of you, viz. to tell me what copy money I may reasonably expect for one edition of a thousand of this volume, which will make a four shillings book: and, if you know any honest man in this trade, to send me a letter of recommendation to him that I may have the choice of more than one man to bargain with."

And again, letter, March 16th, 1740, to the same: " I must trouble you to write that letter you was so kind as to offer to Longman, the bookseller. I concluded somewhat of a hasty bargain with my bookseller from indolence and an aversion to bargaining, as also because I was told that few or no bookseller would engage for one edition with a new author. . . . I . . . also engaged myself heedlessly in a clause, which may prove troublesome, viz. that upon printing a second edition I shall take all the copies remaining upon hand at the bookseller's price at the time."

"from the beginning to the accession of Henry VII," for £1,400, "the first previous agreement ever I made with a bookseller." Millar apparently also bought the "full property" in the first two volumes of the *History* for another eight hundred guineas. Nevertheless, David Hume had reason to protest frequently against the sharp practices of Andrew Millar, who deceived him continually concerning the size of editions and their rate of sale, and reprinted an edition without giving the author the agreed opportunity to correct the text.

Andrew Millar took a leading part in the renewed attempt which the London booksellers made in the middle of the eighteenth century, despite the Copyright Act of 1709, to establish their claim to perpetual copyright.[1] The traffic in "copyrights" of existing books was continued, as though that Act had not been passed; the London booksellers probably depending on each other to respect assignments recorded in the registers of the Stationers' Company. Millar had in 1729 bought *The Seasons* from James Thomson, and duly registered his property in it. In 1763, fifteen years after Thomson's death, another bookseller, Robert Taylor, republished *The Seasons*, and Millar brought an action three years later in the Court of King's Bench. By a curious majority decision, the Court found in 1769, after Millar's death, that the 1709 Act did not take away the author's perpetual copyright which, the Court declared, had existed at common law, and which in this case the author had assigned to Andrew Millar. On the basis of that decision, perpetual copyright was for five years thereafter the law of England. The country booksellers were not prepared to let the matter rest there; Donaldson, the Edinburgh bookseller, republished *The Seasons* once again. Becket, who had purchased the Thomson copyrights at the sale of Millar's effects, secured an injunction against him in the Court of Chancery, and Donaldson in 1774 appealed to the House of Lords. The House invited eleven judges to answer a number of questions on the effect of the Act of Queen Anne, and by six to five they declared that it took away the perpetual rights of authors. The House of Lords, with the lay peers taking an active part (Lord Camden wiped the floor with the London booksellers), voted twenty-two for Donaldson and eleven for Becket.[1] "Thus for ever," says Birrell, "perished perpetual copyright in this realm." The London booksellers, as David Hume advised them to do, made earnest attempts to secure another law, but their prosperity was against them, and opinion was too strong. They did better when they emphasised in those days the interests of authors, just as a century and a half before they found it most profitable to profess anxiety for the safety of the realm. Statutes of 1801 and 1814 extended the period of copyright to the life of the author or for twenty-eight years, whichever period was the longer. Putting on one side the ethics of the question, it seems unlikely that the extension of the term enabled authors to *sell* their copyrights outright to publishers for much greater prices, or had any considerable effect on the output of new literature.

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[1] The three famous cases of Tonson *v.* Collins, 1760; Millar *v.* Taylor, 1766; and Donaldson *v.* Becket, 1774. For a convenient account, see Birrell, *op. cit.*

8. *The Copyright Act of* 1842

This rapid survey of the early history of copyright in this country will have served its purpose if it makes more clear the interests concerned in the important changes introduced into the law by the Act of 1842 (5 and 6 Vic., c. 45), which remained in force right through the remainder of the nineteenth century and was only superseded by the present Copyright Act of 1911. The Copyright Act of 1842 had the effect in general of adding another fourteen years to the monopoly period. Copyright was made to extend for the life of the author plus seven years, or forty-two years from the date of publication, whichever period was the greater. There may be doubt whether the volume of authorship was thereby increased, but it certainly increased the profits to be made from the sale of successful books. The immediate occasion for the passing of this important measure is of interest; if the evidence of a publisher of the time is to be accepted,[2] the Bill found favour in the House of Commons "because it was understood to be for the special benefit of the family of Sir Walter Scott, whose copyright was about to expire under the old law." More specific and less far-reaching means of achieving that particular end might well have been devised.

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[1] It is of interest to note that David Hume at once wrote to Wm. Strahan, the successor to Millar's business, suggesting the transference afresh to him of Hume's property in his most recent alterations to his works. "If nobody can reprint these passages during fourteen years after the first publication, it would effectually secure you so long from any pirated edition." (Letter, March 1st, 1774, in *The Letters of David Hume*.)

[2] Cf. Evidence of John Henry Parker, a retired publisher, before the Royal Commission on Copyright of 1876-8.

For seventy years the Copyright Act of 1842 exercised a far-reaching influence on the output and prices of English books in the United Kingdom. Even before it was passed, critics of the copyright system were calling attention to the high prices which resulted. In 1837, for instance, the Keeper of Printed Books at the British Museum, Thomas Watts by name, advocated in the *Mechanics' Magazine* the adoption of the " compulsory licence " or " royalty " system, by which, since any person who paid to the author a fixed percentage of the selling price would be free to print any book, competition between publishers could be allowed while securing remuneration for authors.[1] During the nineteenth century, the differences between the prices of books in England and the United States were enormous. T. H. Farrer (afterwards Lord Farrer), Secretary to the Board of Trade, presented long schedules of comparative prices as evidence to the Copyright Commission of 1876-8.

9. *The defence of high prices*

The defence of high prices in England which the publishers then advanced was the same as was employed in 1643. " Four books out of five which are published do not pay their expenses. . . . The most experienced person can do no more than guess whether a book by an unknown author will succeed or fail."[2] It was argued that copyright is essential in order that the monopoly profits from successful books might cover the losses. The question is worth a little consideration. Without copyright, publishers no doubt would not issue all of the books which copyright elicits, for competition would reduce the receipts from those which succeed. The higher the profits from the copyright monopoly, the greater the willingness to publish the doubtful successes. The odds in the gamble are made more attractive. Given copyright, therefore, a larger proportion of available manuscripts will be accepted by one publisher or another, and more people will continue to write who in competition would abandon hope of seeing their manuscripts in print and would turn to other occupations. Monopoly is, of course, a common enough device for securing in this way the diversion of scarce resources to particular uses. It is involved in the patent system for inventions, in the chartered-company method of opening up " new " territories, in the " public utility corporation " for the provision of services, and so on. What is generally overlooked by the more enthusiastic advocates of these schemes is the alternative output which the resources would have yielded in other employment. T. H. Farrer, giving evidence before the 1876-8 Commission, no doubt had these considerations more or less clearly in his mind when discussing the weaknesses of copyright. " What we want, I believe, is more good books and cheaper good books; but we do not want more books; we have too many books at present. Some persons, whose opinions are deserving of much consideration, wish to do away with copyright in order to diminish the number of books, and to reduce the number of those who make authorship a trade. They think that to do so would be a gain to the public in providing better books, and that it would not discourage those who write for the sake of reputation or for the sake of truth, and less for the sake of money. I do not say that I agree with these persons, but I think they are right in thinking that we have, under the present system, too many books."[1]

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[1] Cf. Evidence of R. A. Macfie, before the same Commission, and see also A.-C. Renouard : *Traité des Droits d'Auteurs*, Paris, 1838.

[2] *Edinburgh Review*, October 1878 ; article on the Report and Evidence of the Royal Commission on Copyright. Cf. also The Humble Remonstrance of the Company of Stationers, London, to the High Court of Parliament, April 1643 : " Scarce one book in three sells well, or proves gainfull to the publisher."

The fact is, of course, that the eminent publishers who have called attention to the inevitable element of risk in the conduct of their affairs have been prone to exaggerate the unreliability of their judgment in selecting manuscripts for publication at their own risk. Suppose it to be true that four books out of five fail to pay: are they *all*—were they *ever* all—issued at the risk of the publisher? Faced with really risky propositions, do they not suggest to the luckless author that he should share the risk with them, or bear the whole costs, or secure a subsidy from elsewhere? Would it indeed be sound business for a publisher to subsidise definitely hazardous enterprises out of the monopoly profits gained through copyright? Insurance companies select the risks they bear, and publishers do likewise, notwithstanding the fact that the funds *they* risk arise in part from monopoly profits. Where guess-work is a fair description of the publishing business, copyright no doubt increases the amount of risk-bearing by lengthening the odds receivable on the winners. It fails, however, to describe a great part of the book-publishing trade. The fortunes of publishers vary enormously, but the differences are not by any means attributable to luck alone. The authors who (it is of interest to observe) were included on the 1876-8 Royal Commission had had experience with publishers of widely varying success. To Dr. Wm. Smith, for instance, " only one book in four is a very moderate calculation of the books which are successful, of the books which pay their expenses." Anthony Trollope on the other hand had " learned from two publishers within a short period that not one book in nine has paid its expenses, and that still they have been able to carry on the trade." The comment of the Secretary to the Board of Trade was that " the public and the successful author must have to pay handsomely for the publishers' unsuccessful speculations."[1] To the extent that publishers are successful in selecting books which sell, for issue at their own risk, and in requiring the authors to finance the publication of the remainder, copyright legislation does not have the effect of inducing them to undertake more risk-bearing. If the intention be to secure the publication of books for which in a free market authors would have to pay, more certain methods of achieving that end could certainly be devised. And if it could be assumed that there are public reasons for subsidising the production of such books, students of public finance will probably agree that more equitable means could be found of distributing the cost. It is not, however, to be expected that many people would support the principle of indiscriminate encouragement of all books which publishers regard as unlikely to sell in sufficient volume to cover their cost. And this is precisely the result which copyright may secure.

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[1] Evidence of T. H. Farrer, the Secretary to the Board of Trade, March 13th, 1877, Question 5080.

10. *The fixing of prices : author v. publisher*

It may be useful at this stage to set out the interests of authors and publishers respectively in the prices to be charged for books under copyright monopoly. It is not to be supposed that both parties are necessarily best served by a price which restricts the supply of a book to the point of maximum net profit to the publisher. The author's interest will depend rather on the terms of his contract with the publisher, and generally he will be better served by a larger edition and lower selling price than will pay the publisher best. Where the publisher is the entrepreneur, he is concerned to maximise the surplus of aggregate receipts over aggregate costs. The author on the other hand, if paid a fixed sum per copy or a percentage of the published price, has no concern with costs. If paid a fixed sum per copy, the author's receipts will be greater, the lower the final price and the greater the number of copies sold; if he receives a percentage of the published price, his receipts will be greatest when the *gross* receipts from sales are maximised, not (like the publisher) when *net* receipts after deduction of costs are greatest. Since every additional copy printed adds something to the *aggregate* costs of an edition, *net* receipts and the publisher's profit are maximised at a smaller output and higher price than would result in the greatest *gross* receipts and author's income. The divergence of interest is shown clearly in a diagram exhibiting aggregate receipt and cost curves.

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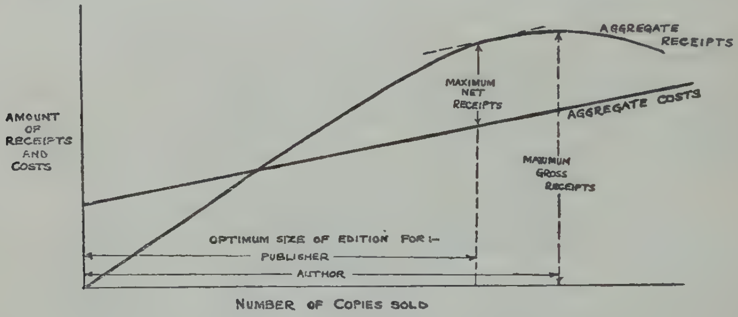
[1] Evidence, March 16th, 1877, Questions 5191-2-3.



The author is therefore usually interested in securing a price and output nearer to the competitive figures than those which pay the publisher best. Only when the author becomes a joint entrepreneur, and shares the net profits with the publisher after the deduction of costs, do their interests in monopoly restriction coincide; and only in the case in which the author takes the whole risk and pays the publisher a commission based on costs or gross receipts is the author concerned to issue a smaller edition at a higher price than the publisher would wish for.

11. *Price discrimination at home and abroad*

In the nineteenth century the extremely high prices which English publishers exacted for books, behind the copyright law, led to the emergence of the circulating libraries, which became in due course a powerful vested interest standing in the way of a lower-price policy. As the most important buyers of new books, particularly novels and biography, and dependent upon high book prices for public support, the circulating libraries attained to a position in which they could insist upon the publishers maintaining high prices to the public for a term of years while supplying the libraries at less than wholesale rates.[1] By issuing first an expensive and later a cheaper edition, the publishers practised a very profitable form of price discrimination in the home market; but the libraries enforced a longer delay than some of them desired.

A discriminating price policy for the overseas markets has long been a regular feature of the publishing trade. Circulating libraries may pay less than booksellers for their supplies, but " colonial editions " usually sell at still lower prices. In the nineteenth century the reasons were diverse: the colonial communities were poorer, less interested in books and more cheaply supplied from other countries, particularly the United States and even the Continent, despite the difference of language. Notwithstanding dumping, the prices charged by English publishers for export were too high to meet the requirements of British colonial policy. In 1835, apparently, the India Council decided to admit the cheap American reprints of English books into India: the taste for the English language and literature could not be cultivated widely enough at the prices ruling for English editions.

12. *The " compulsory licence " or " royalty " proposal*

In such circumstances it is not surprising that increasing attention came to be paid to proposals for encouraging competition between English publishers by the introduction of the compulsory licence or " royalty " system. As has been said, the Keeper of Printed Books at the British Museum advocated the system as early as 1837. R. A. Macfie, who had for years pressed the same proposal in the case of patents for inventions (the " licence of right " system was eventually introduced on a voluntary basis in 1919), gave evidence before the Copyright Commission of 1876-8 in which he outlined a scheme under which any publisher might issue an edition of any book on payment, during the term of the copyright period, of a percentage of the published price to the author or his assigns. Thereby the supply of successful books, and quite possibly the remuneration of authors, would be increased. In Italy the law already provided for this system, at the end of a long term of ordinary copyright. The Canadian Government had just passed a law, as a measure of protection against pirated editions from the United States, permitting Canadian publishers to reprint English books on payment of royalty to English authors. Sir Charles Trevelyan and many others favoured the adoption of the system in England; but the Secretary to the Board of Trade, though personally sympathetic and strongly in favour of the free importation of cheap Canadian reprints into England, advised the Commissioners that the proposal was scarcely a practical question at the moment.[1] Only one of the fifteen Commissioners ultimately viewed it with favour; the rest, including the authors, feared that if publishers' profits were reduced, unproven books would not be so willingly published. Herbert Spencer gave evidence against the proposal, citing his own experience as an author of philosophical works. According to his figures, it was twenty-four years after the publication of his first book before the losses on his works had been recouped. It should, however, be said that he included in the costs of publication his own " cost of economical living " during the period, that despite the copyright law he apparently had to issue the books at his own expense and risk, and that his receipts from sales in America (where he had no copyright to keep up prices) were apparently greater than from those in England. He estimated his net profits on sales in 1876, twenty-six years after publishing his first book, at 41¾ per cent., and he naturally feared that a law which allowed any publisher to reissue his books on paying him a royalty of 10 per cent. might not yield him the same income. He regarded himself as entitled to a monopoly because in his view the demand for his works was inelastic for a fall in price: the royalty system, he thought, " would be especially injurious to the particular class which of all others needs encouragement," the books described by the chairman of the Commission as " of the graver class which do not appeal to the popular tastes." Students of philosophy were fair game for monopolistic authors.

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[1] See evidence to the 1876-8 Commission, e.g. George Routledge : ". . . In the case of novels published for the circulating libraries, you must give the trade a certain time [before lowering the price], or else they will not take them." Sir Charles E. Trevelyan : ". . . No doubt if the monopoly were abolished the circulating libraries would collapse."

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[1] Evidence of T. H. Farrer on January 31st, 1877 : " It is, however, at the present moment in this country, scarcely a practical question. . . . Whatever advantages a system of royalty might have, it would require new machinery of an elaborate kind, and it would disturb existing arrangements, and be opposed by existing interests. It is, therefore, not worth while now to discuss it, nor am I prepared to meet the various difficulties of detail which would no doubt arise in considering it. To do so would require a far greater knowledge of the practice of the trade than an outsider can pretend to. But judging from the little I have been able to gather I should not think them insuperable."

13. *The Copyright Act of* 1911: *the introduction of the* " *royalty* " *system*

These considerations, therefore, were responsible in 1878 for the decision of the Commission that " it is not expedient to substitute a right to a royalty defined by statute, or any other right of a similar kind " for copyright as it then existed. It is consequently of particular interest to observe that thirty years later it was largely due to the pressure of a group of publishers, in another field, for the *adoption* of the royalty or compulsory licence system that the present amending and codifying Copyright Act of 1911 (1 and 2 Geo. V, ch. 46) was framed and passed. The publications in question were mechanical reproductions of musical compositions. In 1908 a revised International Copyright Convention was signed in Berlin, and by its thirteenth article ratifying countries were invited to confer on authors and composers the exclusive right of authorising such reproductions. A departmental committee of the Board of Trade was appointed in 1909 to consider the consequential changes that were desirable in the copyright law of this country. Hitherto a large business in mechanical reproduction had been built up by gramophone companies and manufacturers of perforated music rolls and the like, on the assumption that authors and composers had no right to restrain the reproduction of their works by these means. Those who prefer such language might say that the trade coolly pirated musical works. The companies feared a serious disturbance and restriction of their business if the thirteenth article became law in this country: one large concern might secure rights so extensive as practically to exclude the others. They therefore presented important evidence before the departmental committee, unanimously demanding a compulsory licence system for musical compositions, on the lines of an Act of 1909 which had just been passed in the United States, in order that they might retain their existing freedom to reproduce published music, subject only to a new liability to pay remuneration to the composer. Not every musical composition, however, is capable of perfect performance on a barrel-organ; and composers who gave evidence objected strongly to the compulsory licence proposal, insisting on their right "to control the mode in which their pieces are produced and the character of the instrument which produces them." The Committee with one dissentient reported in favour of the thirteenth article and the composers, and against the compulsory licence system. Nevertheless, the 1911 Copyright Act (Section 19) made provision for compulsory licences for "records, perforated rolls, or other contrivances by means of which . . . [musical works] may be mechanically performed."

The method adopted in this country for remunerating the composer differs from that in the United States, where a fixed specific royalty of two cents was made payable on each gramophone record. The gramophone companies favoured the American system, and in their evidence before the departmental committee they opposed a royalty system based on a percentage of the selling price of the record, on the ground that a composer would then be "paid for the value put into it by the interpretation of the great artiste." There was further the problem of deciding one rate of remuneration for all composers. Both difficulties had been anticipated in 1838 by A.-C. Renouard.[1] The basis adopted in the Act was, after the first two years of its operation, 5 per cent. royalty on the retail selling price of the contrivance, with a minimum of one halfpenny for each separate musical work in which copyright subsists. The Board of Trade is empowered, after public inquiry, to vary the rate by provisional order, at minimum intervals of fourteen years; and the administration of the system is controlled by the Board by regulation, apparently without insuperable difficulty.

The Act of 1911 again increased the duration of copyright in general, but in the same clause a most important innovation was inserted, at last introducing the royalty system into book publishing for the last twenty-five years of the copyright period. During that time, any person may reproduce a published work, after giving written notice and on paying royalties of 10 per cent. of the published price to the owner of the copyright on all copies sold. No great difficulty seems to have arisen in administering this clause. The increase in the term of copyright, in accordance with the Berlin convention, to the life of the author and a further period of fifty years is hardly likely to have affected the terms of original publishing contracts and the output of authors' manuscripts; but the new royalty system now makes it possible for at any rate the second generation of readers after the death of an author to enjoy a wider circulation of his books at lower prices, in spite of the increase in the copyright period.

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[1] See his *Traité des Droits d'Auteurs*, Volume I, § IX, p. 463. Of the royalty system, he wrote "Ce qui le rend inadmissible, c'est l'impossibilité d'une fixation régulière, et l'excessive difficulté de la perception. Peut-être, à force de soins, surmonterait-on les obstacles à la perception ; mais, quant à la fixation de la redevance, le réglement en est impossible. . . . Demandera-t-on à la loi de déterminer une redevance fixe ? mais quoi de plus injuste qu'une mesure fixe, rendue commune à des objets essentiellement inégaux ? . . . Si votre redevance a pour base une valeur proportionnelle, chaque Télémaque de deux cents francs produira, pour le seul droit de copie, plus que ne vaudra, dans l'autre édition [à vingt sous], chaque exemplaire tout fabriqué ; et cependant ce sera toujours le même texte qui n'aura pas plus de valeur intrinsèque dans un cas que dans l'autre."

14. *Some conclusions concerning the necessity for copyright*

The conclusions concerning the necessity for copyright which emerge from this survey may now be summarised. The parallelism with the case of patents for inventions is of course very marked. In the first place, expectation of direct reward explains only a part of the total output of literature, just as it fails to account for more than part of the inventions which are made. Secondly, just as professional inventors continue to be paid for their services in fields in which the patent system does not apply, so also have professional authors in modern times been remunerated for their writings, whether by payment of a lump sum or by way of royalty on the sale of copies, in a country in which they were unprotected by copyright law. The publishers of new books are simply a special case of the manufacturers who exploit new but non-patentable inventions for which they pay the inventor. (Where no payments have to be made to authors, and the demand for the book is not in serious doubt, publishers are not of course deterred by fear of competition from issuing an edition. Of that fact the abundance of contemporary editions of standard works selling successfully against each other at different prices and in a variety of formats, affords a continual demonstration.) Thirdly, copyright monopoly, like patent monopoly, enables the privileged producers to increase their receipts from successful products by restricting the supply, and in so far as experience and special skill are unavailing when a publisher tries to gauge the relative chances of success of certain kinds of manuscript books, copyright will, as we have seen, lead to an increased volume of risk-bearing. This consideration applies, however, over a definitely limited range of books; and it is extremely doubtful on reflection whether there exist any public reasons for the *indiscriminate* encouragement of the literature that falls into this category. Nor is there any reason why the increased volume of risk-bearing which copyright may elicit from certain publishers should materialise in the form of books alone: a prudent business man might well spread the risk more widely to include some racing or a gamble at Lloyd's with his book publishing. The odds might be still more attractive. It is at least doubtful whether book-buyers and successful authors should be specially selected, by the effects of copyright on the price of the books which sell, to provide the fund which increases the element of gambling inherent in the book-publishing business.

More authors write books because copyright exists, and a greater variety of books is published; but there are fewer copies of the books which people want to read. Whether successful authors write more books than they otherwise would is a question of " the elasticity of their demand for income in terms of effort "—they may prefer now to take more holidays or retire earlier. Some of them are in any case well advised to write different books—instead of writing what they would otherwise want to say or have to say, they find it more remunerative to write the sort of thing for which the demand conditions are most appropriate for ensuring the maximum monopoly profit.

The expectation of higher profits from book publishing as the result of copyright tends to increase the number of publishers in the business. Keen competition between publishers will enable the authors, whose copyright monopoly they are anxious to share, to make better bargains; with the result that the remuneration of publishers will tend to fall to the market rate of return on their capital and skill in other fields. Apart, however, from the increased volume of unpleasant " remainders," the prices of books will remain above the competitive level so long as copyright subsists.

There is, of course, no system of economic calculus which supports the contention that output of the type which monopoly induces is " preferable " to that which emerges from the different disposition of the same scarce productive resources resulting from the competitive bidding of the open market. One special weakness of copyright monopoly as an administrative device is the *non-discriminatory* nature of the encouragement it affords to ventures which are too risky to be embarked upon in a free market. It is not difficult to imagine particular cases in which literary effort might well be specially encouraged on public grounds. Large undertakings involving many expert contributors and expensive illustrations might not invariably find sufficient backers and " advance subscribers," in view of the large capital outlay to be made by the first publishers, to make them commercial propositions. Yet if there were public reasons for financing particular ventures of this sort, subsidies provided from general taxation have more to commend them than a copyright monopoly; and if that system were politically impossible, it would surely be better that copyright monopoly be limited to such enterprises, by some such system as that in which the Comptroller of Patents is at present authorised to grant *exclusive* licences to manufacturers to exploit inventions which " cannot be . . . worked without the expenditure of capital for the raising of which it will be necessary to rely on the patent monopoly " (Patents and Designs Act, 1907, as amended, Section 27 (3), (c)). It is, however, a far cry from hard cases of this sort to a comprehensive system of copyright for *all* new books. To the economist who studies the statements of the case for and against the copyright system as we know it, there is no document more satisfying in its logic than the minority report in which Sir Louis Mallet, a member of the Royal Commission on Copyright of 1876-8, stated the arguments against the continuance of the monopoly. His conclusion was that in the absence of copyright " it will always be in the power of the first publisher of a work so to control the value, by a skilful adaptation of the supply to the demand, as to avoid the risk of ruinous competition, and secure ample remuneration both to the author and himself."[1]

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[1] The uniformly high quality of reasoning in Sir Louis Mallet's minority report can be appreciated only if it is read as a whole, but a small extract may perhaps be quoted with advantage :

> ". . . . Property exists in order to provide against the evils of natural scarcity. A limitation of supply by artificial causes, creates scarcity in order to create property. . . . It is within this latter class that copyright in published works must be included. Copies of such works may be multiplied indefinitely, subject to the cost of paper and of printing which alone, but for copyright, would limit the supply, and any demand, however great, would be attended not only by no conceivable injury to society, but on the contrary, in the case of useful works, by the greatest possible advantage. . . . The case of a book is precisely analogous to that of a house, of a carriage, or of a piece of cloth, for the design of which a claim to perpetual copyright has never, I believe, been seriously entertained."

15. *A practical proposal*

In 1878, however, the abolition of copyright was to Sir Louis Mallet " a question of the future." That is still true. As he observed, " in a matter which affects so large and valuable a property, and so many vested interests as have been created under copyright laws, it would be both unjust and inexpedient to proceed towards such a change as has been foreshadowed, except in the most gradual and tentative manner." By a very simple change in our copyright legislation, the next important step forward might now be taken. It is practicable, in that it merely changes the date at which part of the already existing and tested administrative machinery set up under the Copyright Act of 1911 comes into operation in the case of every copyrighted book; and, further, in that the price policy already adopted by many publishing houses for their most successful books already conforms very closely to that which the simple change would ensure for all books which are reprinted after the first edition. As long ago as 1771, David Hume wrote to his publisher William Strahan: " I have heard you frequently say, that no bookseller would find profit in making an edition which would take more than three years in selling." In 1876, John Blackwood told the Copyright Commission: " Every publisher now is aware from actual experience that in order to reap the full benefit of a book, he must work it in a very cheap form as well as an expensive one." In our own day, it is surely the common practice of publishers to issue a cheap edition of successful books very promptly after the first expensive issue has served its purpose with the circulating libraries. If the now existing compulsory licence or royalty system (Copyright Act, 1911, Section 3) were made to operate a few years—say five years—after first publication, instead of being delayed as at present until twenty-five years after the death of the author, security for publishers against competition would be preserved until their first editions were either disposed of or " remaindered," remuneration for authors would continue on all sales throughout the full copyright period, and the public would no longer have to wait more than five years for cheap copies of the books they wish to buy. The first edition might still be issued by the publisher at the price which best suited his pocket under conditions of monopoly, but if he wished to retain the whole of the business the compulsory licence system would then compel him to follow the present practice of many publishers and reissue his successes before the end of the five-year period at a price low enough to deter competitors. There is, of course, nothing to prevent the successful sale, side by side, of a number of editions by various publishers at different prices and in different formats; and in many cases the author's remuneration from his 10 per cent. royalty under the compulsory licence system would be greater than it is at present. There remains the theoretical objection, which we have already noticed in connection with the existing royalty provision, to fixing one percentage of royalty for all books and to giving authors a share in the value added by paper-makers and printers and binders to the more expensive editions; but their practical significance can hardly be deemed to outweigh the obvious public advantage to be derived from the change. The most widely read authors would still secure the greatest royalties from books selling at the same price, and something can even be said for allowing authors additional remuneration if their books are capable of sale in expensive as well as cheap editions. The change would, of course, tend to reduce the volume of risk-taking on purely speculative publications—a consequence which, it has already been argued, is hardly likely to involve any considerable impoverishment of our literary heritage. Particular cases might still form the subject of special provision. The objection might be raised that academic texts and scientific treatises, which undergo constant revision for each edition, might then be reissued in obsolete condition; but with the adoption of the system, authors would surely see the wisdom of permitting the necessary alterations to be made to keep reprinted editions up to date. Drastic modifications would no doubt be made to an increased extent in the form of entirely new works—a development which indeed from other points of view has much to commend it. There cannot be any question that it would be in the public interest to ensure low prices for books as early as possible after the fate of the first edition has revealed that a demand exists for them; and it is an important feature of the proposed amendment that it involves no new administrative principle, that it enables the continuance of, if not indeed an increase in, the remuneration of authors whose books the public want, and lastly that it simply confirms and extends throughout the book-publishing business the price policy which successful publishers already pursue in their own interests.

A Reconsideration of the Theory of Value

By J. R. HICKS and R. G. D. ALLEN

Part II.—A Mathematical Theory of Individual Demand Functions

By R. G. D. ALLEN

THE established definition of the way in which a pair of goods can be related in an individual's scale of preferences is due, in its precise form, to Edgeworth and Pareto. The definition assumes the existence of a utility function giving the utility to the individual of any combination of the set of consumers' goods, $X, Y, Z, \ldots\ldots$, which enter into the individual's budget. Denoting the function by $u=\phi(x,y,z, \ldots\ldots)$, the Edgeworth-Pareto definition of the relation between any pair of goods, X and Y, depends on the sign of $\frac{\partial^2 u}{\partial x \partial y}$. The goods are *complementary* or *competitive* according as $\frac{\partial^2 u}{\partial x \partial y}$ is positive or negative. If the individual possesses an increased amount of one good, the marginal utility of the other good increases in the complementary case and decreases in the competitive case.

This definition ignores one fundamental fact. Even if the utility function exists at all, it is by no means unique and it can serve only as an *index*, and not as a *measure*, of individual utility. Pareto himself established this fact, but failed to deduce the logical corollary that the derivative $\frac{\partial^2 u}{\partial x \partial y}$ is also indeterminate both in sign and in magnitude. To prove this corollary we proceed as follows. The utility function index is the integral of the "indifference" differential equation:

$$\phi_x dx+\phi_y dy+\phi_z dz+\ldots\ldots=0,$$

where ϕ_x, ϕ_y, ϕ_z, ... are the marginal utility functions, determinate only as to their ratios. If $u=\phi(x,y,z,\ldots\ldots)$ is *one* form of the integral, and if $\phi_x, \phi_y, \phi_z, \ldots\ldots$ are arranged to be the partial derivatives of this function, then the general utility function index is :

$$u=F\ \{\phi(x,y,z,\ldots\ldots)\}$$

where F is an arbitrary function with a positive derivative.[1]

The partial derivatives of the function index are

$$\frac{\partial u}{\partial x}=F'(\phi).\phi_x;\ \frac{\partial u}{\partial y}=F'(\phi).\phi_y;\ \frac{\partial u}{\partial z}=F'(\phi).\phi_z;\ldots\ldots$$

The signs of these derivatives are the signs of $\phi_x, \phi_y, \phi_z, \ldots\ldots$ respectively and their ratios are determinate (as required). On the other hand, the sign of the second-order derivative

$$\frac{\partial^2 u}{\partial x \partial y}=F'(\phi).\phi_{xy}+F''(\phi).\phi_x.\phi_y$$

cannot be taken as determinate and it depends entirely on the form adopted for the arbitrary function.[2] The above definition of complementary and competitive goods is thus indefinite; for a given combination $(x,y,z,\ldots\ldots)$, the same pair of goods can be sometimes complementary and sometimes competitive according to the form taken for the utility function index. The Edgeworth-Pareto definition is not adequate for the distinction of relations between a pair of goods and it must be rejected in any precise theory of individual choice. The development which follows will decide, amongst other things, what can be put in its place.

I. INDIVIDUAL DEMAND IN THE CASE OF TWO GOODS

1. In the present section we shall consider the case where only two goods, X and Y, enter into the budget of a given individual. The case can be interpreted in two ways. *Either* all goods other than the pair XY are possessed by the individual in known amounts, and he considers his expenditure on X and Y independently, *or* the pair XY represent two broad classes of goods (e.g. food and other items) which together make up the individual's complete budget. In either case, it is seen that the theory of demand for two goods is subject to severe limitations in possible applications.

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[1] The positive derivative is only necessary to ensure that u is a genuine index of utility in the sense that all its forms increase or decrease together.

[2] The only case in which $\frac{\partial^2 u}{\partial x \partial y}$ is definite in sign is when either ϕ_x or ϕ_y is zero, i.e. when the marginal utility ratio $\phi_x : \phi_y$ is zero or infinite and the individual is "saturated" with one of the goods. This possibility does not concern us in our consideration of the individual under market conditions.

2. *The individual's scale of preferences.*—The individual possesses the combination (x,y) of amounts of the two goods X and Y.[1] The fundamental postulate of the theory is that there exists a unique "indifference direction" for variations from the combination (x,y) defined by a differential equation:

$$dx+R^y_x dy=0 \qquad\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1).$$

The equation expresses a relation between increments dx and dy (one positive and one negative) which just compensate each other as far as the individual is concerned. The expression $R^y_x=-dx/dy$ is the (limiting) ratio of compensating increments in x and y,[2] i.e. R^y_x is *the marginal rate of substitution of X for Y*. As the combination (x,y) varies, so does the individual's indifference direction and the value of R^y_x. In fact, R^y_x is a function of x and y, and its values for various combinations (x,y) describes *the scale of preferences* of the individual. Only the function R^y_x is needed, since the marginal rate of substitution of Y for X is $R^x_y=1/R^y_x$.

Three assumptions are made about the scale of preferences:

(1) R^y_x is a continuous function of x and y.
(2) R^y_x is positive at all points (x,y).
(3) For the variation of the indifference direction from any point, the expression $dx+R^y_x dy$ always decreases:
$d(dx+R^y_x dy)<0$ subject to $dx+R^y_x dy=0$,
i.e.
$$\begin{vmatrix} 1 & R^y_x \\ \dfrac{\partial}{\partial x}R^y_x & \dfrac{\partial}{\partial y}R^y_x \end{vmatrix} = \frac{\partial}{\partial y}R^y_x - R^y_x\frac{\partial}{\partial x}R^y_x<0 \quad\ldots\ldots(2).$$

The differential equation (1) is always integrable, and from it is obtained a system of *indifference curves* in the OXY plane. The tangent to the indifference curve at any point has gradient $(-R^y_x)$ referred to OY, or gradient $(-R^x_y)$ referred to OX. The first two assumptions imply that each indifference curve has a continuously variable tangent which is always downward sloping. The third assumption implies that the indifference curves are everywhere convex to O. The numerical value of the tangent gradient referred to OY (or to OX) increases as we move along an indifference curve away from OY (or away from OX). The marginal rate of substitution of X for Y increases as we continue to substitute X for Y. This is *the principle of increasing marginal rate of substitution.*[1]

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[1] The problem is a completely static one and the time element is abstracted by taking x and y as amounts that come into the possession of the individual (to be disposed of by him) per unit of time.

[2] The "preference direction" of the individual (i.e. his most preferred direction of acquisition of the goods) is at right angles to the "indifference direction." Hence, $R^y_x=dy/dx$ along the preference direction. There is thus a second interpretation of R^y_x, the marginal rate of increase of y with respect to x for a change in the preference direction.

There are three characteristics or *indices of the individual's scale of preferences* which are sufficient to describe the complete form of the scale or of the indifference curve system. All the indices are expressed in terms of first-order variations of R^y_x; they refer only to the scale of preferences itself and not to market conditions. It will be found, further, that the indices are sufficient for the description of the individual's reaction to market conditions.

The first index refers to a single indifference curve only. *The elasticity of substitution* between X and Y is defined as

$$\sigma = \frac{d\left(\frac{x}{y}\right)}{\frac{x}{y}} \Bigg/ \frac{dR^y_x}{R^y_x} = \frac{d\left(\frac{y}{x}\right)}{\frac{y}{x}} \Bigg/ \frac{dR^x_y}{R^x_y}$$

taken along the indifference direction at (x,y). Hence:

$$\sigma = -\frac{R^y_x}{xy} \frac{x + R^y_x y}{\frac{\partial}{\partial y} R^y_x - R^y_x \frac{\partial}{\partial x} R^y_x} > 0$$

from the condition (2). The elasticity of substitution is independent of units and is symmetrical with respect to x and y. It is a measure of the curvature of the indifference curve at (x,y), varying in value from zero when the curve is in the form of a right angle at (x,y) to very large values when the curve is flat.

The other two indices refer to the relation of one indifference curve to another and adjacent curve, and they can be called the *coefficients of income-variation*:

$$\rho_x = -\frac{y}{R^y_x} \frac{\partial}{\partial y} R^y_x \text{ and } \rho_y = \frac{x}{R^y_x} \frac{\partial}{\partial x} R^y_x.$$

Both coefficients are expressed in " elasticity " form and are independent of units. It follows from (2) that ρ_x and ρ_y cannot both be negative; they are both positive in the " normal " case and one is positive and the other negative in the " exceptional " case.

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[1] Of the three assumptions made here, the first is introduced simply for mathematical convenience, but, apart from this, there is no reason to assume away discontinuities in the indifference curve system. The other two assumptions are on a different footing, but they are not *necessarily* satisfied. They must certainly be relaxed when the individual possesses so much of one (or more) of the goods that he would pay to get rid of it. Further, it is not contended that they apply to a position on the preference scale where the individual finds himself below the " subsistence level." It *is* maintained, however, that the assumptions serve to describe all positions in which the individual is likely to find himself under market conditions.

3. *The individual demand functions.*—If the individual spends a given money income μ on the two goods X and Y at given uniform market prices p_x and p_y, then his equilibrium purchases are given by the following conditions for equilibrium:

$$xp_x + yp_y = \mu \text{ and } \frac{1}{p_x} = \frac{R_x^y}{p_y} \qquad \text{...........(3).}$$

In diagrammatic terms, the equations correspond to the fact that the purchases of the individual in equilibrium are represented by the co-ordinates of the point in XY space where the given price line (i.e. $xp_x+yp_y=\mu$) touches an indifference curve. The solution of the equations (3) gives x and y as functions of μ, p_x and p_y—the individual *demand functions*. By the assumption of increasing marginal rate of substitution (indifference curve system convex to the origin), a single equilibrium position exists for each set of μ, p_x and p_y, and the demand functions are single-valued.[1]

Let the proportions of total income spent on X and on Y be denoted by $\kappa_x = \frac{xp_x}{\mu}$ and $\kappa_y = \frac{yp_y}{\mu}$ (where $\kappa_x + \kappa_y = 1$). From the equations (3) the values of the three indices of the scale of preferences in the equilibrium position are:

$$\sigma = - \frac{\dfrac{\mu}{xy} \quad \dfrac{p_y}{p_x}}{p_x \dfrac{\partial}{\partial y} R_x^y - p_y \dfrac{\partial}{\partial x} R_x^y} \; ; \quad \rho_x = - \frac{yp_x}{p_y} \frac{\partial}{\partial y} R_x^y \; ;$$

$$\rho_y = \frac{xp_x}{p_y} \frac{\partial}{\partial x} R_x^y .$$

The problem is to trace the variation of the equilibrium position and of the demand functions as income or prices vary.

(*a*) *Income-elasticities of demand.*—Let μ vary while p_x and p_y are kept fixed, and denote the income-elasticities of the demand functions by

$$E_\mu(x) = \frac{\mu}{x} \frac{\partial x}{\partial \mu} \text{ and } E_\mu(y) = \frac{\mu}{y} \frac{\partial y}{\partial \mu}.$$

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[1] The relaxing of the third assumption made above leads to multiple positions of equilibrium and to multi-valued demand functions. The introduction of this complication is not necessary unless, and until, the simpler theory, based on the third assumption, fails to describe the phenomena of the market.

Differentiate (3) partially with respect to μ:

$$\left.\begin{aligned} xp_x\, E_\mu(x) \quad + \quad yp_y\, E_\mu(y) &= \mu \\ x\frac{\partial}{\partial x}\, R^y_x\, E_\mu(x) + y\frac{\partial}{\partial y}\, R^y_x\, E_\mu(y) &= 0 \end{aligned}\right\} \quad \ldots\ldots\ldots\ldots(4).$$

The solution of the equations (4), making use of the equilibrium values of σ, ρ_x and ρ_y, appears quite easily in the form:

$$E_\mu(x) = \sigma\,.\,\rho_x \text{ and } E_\mu(y) = \sigma\,.\,\rho_y \quad \ldots\ldots\ldots\ldots\ldots\ldots(5).$$

From the first equation of (4), it follows at once that

$$\kappa_x E_\mu(x) + \kappa_y E_\mu(y) = 1.$$

and hence that $\kappa_x\rho_x + \kappa_y\rho_y = \frac{1}{\sigma}$.

It is not possible for both $E_\mu(x)$ and $E_\mu(y)$ to be negative: in the " normal " case both are positive and the demands for X and Y increase with increasing income. In the " exceptional " case, on the other hand, one income-elasticity is negative and the demand for this good decreases with increasing income. If the income-elasticity of demand for a good is negative, this good is said to be *inferior* to the other good.

Notice that $E_\mu(x)$ is a positive multiple (σ) of the second index of the individual's preference scale and that $E_\mu(y)$ is the same multiple of the third index. The income-elasticities of demand can thus be used instead of these two indices.

(*b*) *Price-elasticities of demand.*—Let p_x vary while μ and p_y are kept fixed, and denote the p_x-elasticities of demand by

$$E_{px}(x) = -\frac{p_x}{x}\frac{\partial x}{\partial p_x} \text{ and } E_{px}(y) = -\frac{p_x}{y}\frac{\partial y}{\partial p_x}.$$

Differentiate (3) partially with respect to p_x:

$$\left.\begin{aligned} xp_x\, E_{px}(x) \quad + \quad yp_y\, E_{px}(y) &= xp_x \\ x\frac{\partial}{\partial x}\, R^y_x\, E_{px}(x) + y\frac{\partial}{\partial y}\, R^y_x\, E_{px}(y) &= \frac{p_y}{p_x} \end{aligned}\right\} \quad \ldots\ldots(6).$$

$$\text{So } \frac{xE_{px}(x)}{xp_x\frac{\partial}{\partial y}R^y_x - \frac{p_y^2}{p_x}} = \frac{yE_{px}(y)}{xp_x\frac{\partial}{\partial x}R^y_x - p_y} = \frac{1}{p_x\frac{\partial}{\partial y}R^y_x - p_y\frac{\partial}{\partial x}R^y_x}.$$

$$\text{Hence } E_{px}(x) = \frac{yp_x}{\mu p_y}\,\sigma\left(\frac{xp_y}{y}\rho_x + \frac{p_y^2}{p_x}\right) = \kappa_x E_\mu(x) + (1-\kappa_x)\,\sigma$$

$$\text{and } \quad E_{px}(y) = \frac{xp_x}{\mu p_y}\,\sigma\,(p_y\rho_y - p_y) = \kappa_x E_\mu(y) - \kappa_x\sigma,$$

using the results (5) and the equilibrium values of σ, ρ_x and ρ_y.

Similar results hold for the p_y-elasticities of demand. Hence:

$$\left.\begin{aligned} E_{px}(x) &= \kappa_x E_\mu(x) + (1-\kappa_x)\,\sigma \\ E_{px}(y) &= \kappa_x E_\mu(y) - \kappa_x\,\sigma \\ E_{py}(x) &= \kappa_y E_\mu(x) - \kappa_y\,\sigma \\ E_{py}(y) &= \kappa_y E_\mu(y) + (1-\kappa_y)\,\sigma \end{aligned}\right\} \dots\dots\dots\dots(7).$$

Two relations exist between the four price-elasticities of demand given by (7). From the first equation of (6)

$$\kappa_x E_{px}(x) + \kappa_y E_{px}(y) = \kappa_x.$$

Similarly $$\kappa_x E_{py}(x) + \kappa_y E_{py}(y) = \kappa_y.$$

The conclusions that can be derived from the equations (7) are set out fully by Dr. Hicks.[1] There is, however, one point that cannot be over-emphasised. The substitution term in $E_{py}(x)$ and in $E_{px}(y)$ is always negative, and a fall in the price of one good causes a substitution of this good for the other. Hence, two goods must always be regarded as substitutes, or as "competitive," when they stand by themselves; complementarity is a characteristic which does not appear until at least three goods are considered.[2] Further, if the elasticity of substitution is a more important (i.e. numerically larger) quantity than the income-elasticities, then both the "cross" price-elasticities $E_{px}(y)$ and $E_{py}(x)$ are negative, i.e. both $\frac{\partial y}{\partial p_x}$ and $\frac{\partial x}{\partial p_y}$ are positive. This is the traditional characteristic of substitute or "competitive" goods in a general sense. But, if the income-elasticities are at least as important in magnitude as the elasticity of substitution, then the derivatives $\frac{\partial y}{\partial p_x}$ and $\frac{\partial x}{\partial p_y}$ can be of either sign, and their signs need not agree.

II. INDIVIDUAL DEMAND IN THE CASE OF THREE OR MORE GOODS

1. We turn now to the general case where any number of inter-related goods enter into the individual's budget. In order to simplify the mathematical analysis, only the case of three goods is considered in detail. It is a difficult step from the case of two goods to that of three goods, but no additional difficul-

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[1] Hicks, ECONOMICA, February 1934, pp. 65 *et seq.* This is the first part of the present joint article.

[2] The coefficient of κ_x or κ_y in the second term of $E_{px}(y)$ or $E_{py}(x)$ is what corresponds to the "elasticity of complementarity" in the general case considered in the following section. Here the coefficient is equal in magnitude but opposite in sign to the elasticity of substitution.

ties or complications are encountered in the generalisation of the latter to the case of n goods.

2. *The individual's complex of preferences.*—The fundamental postulate is that, for variations from any combination (x,y,z) of amounts of three goods, X, Y and Z, possessed by the individual, there exist certain definite "indifference directions" defined by the differential equation:

$$dx + R^y_x dy + R^z_x dz = 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8),$$

where the increments dx, dy and dz can take any values that compensate for each other as far as the individual is concerned. The expression $R^y_x = -dx/dy$ (z constant) is *the marginal rate of substitution of X for Y*, and $R^z_x = -dx/dz$ (y constant) is *the marginal rate of substitution of X for Z*. Both R^y_x and R^z_x are functions of x, y and z, and together their values make up the individual's *complex of preferences*.[1] Other marginal rates of substitution exist but can be obtained from the two written above: $R^x_y = 1/R^y_x$; $R^x_z = 1/R^z_x$; $R^z_y = R^z_x . R^x_y$; $R^y_z = R^y_x . R^x_z = 1/R^z_y$.

Three assumptions[2] are made about the individual's complex of preferences:

(1) R^y_x and R^z_x are continuous functions of x, y and z.

(2) R^y_x and R^z_x are positive at all points (x,y,z).

(3) For a variation in any indifference direction from any point, the expression $dx + R^y_x dy + R^z_x dz$ decreases:

$$d(dx + R^y_x dy + R^z_x dz) < 0 \quad \text{subject to} \quad dx + R^y_x dy + R^z_x dz = 0,$$

$$\text{i.e.} \quad \begin{vmatrix} 1 & R^y_x \\ \frac{\partial}{\partial x} R^y_x & \frac{\partial}{\partial y} R^y_x \end{vmatrix} \quad \text{and similar determinants are } \textit{negative}$$

$$\text{and} \quad \begin{vmatrix} 1 & R^y_x & R^z_x \\ \frac{\partial}{\partial x} R^y_x & \frac{\partial}{\partial y} R^y_x & \frac{\partial}{\partial z} R^y_x \\ \frac{\partial}{\partial x} R^z_x & \frac{\partial}{\partial y} R^z_x & \frac{\partial}{\partial z} R^z_x \end{vmatrix} \quad \text{is } \textit{positive} \quad \ldots\ldots\ldots\ldots (9).$$

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[1] The term "complex" of preferences is a better description of this idea in the general case than the term "scale" of preferences which suffices in the simpler two goods case. In the general case (without the integrability condition) it is not possible to "integrate" the preferences of an individual into anything like a complete and ordered scale. The "preference direction" (the most preferred direction) of the individual is still unique, and it is at right angles to each of the indifference directions. It is given by

$$\frac{dx}{1} = \frac{dy}{R^y_x} = \frac{dz}{R^z_x}.$$

Hence, $R^y_x = dy/dx$ and $R^z_x = dz/dx$ for a change in the preference direction.

[2] As before, the assumptions are not *necessarily* satisfied but serve to describe all situations in which the individual is likely to find himself under market conditions.

If the differential equation (8) is integrable (which is not always, or even usually, the case), then a complete indifference surface system exists in XYZ space. The first two assumptions imply that each indifference surface has a continuously variable tangent plane which is always downward sloping both in the OX direction and in the OY direction. The third assumption implies that the indifference surfaces are everywhere convex to O. In particular, the second-order determinants with negative values in (9) give the principle of increasing marginal rate of substitution—the marginal rate of substitution of one good for another increases as we continue to substitute these goods, the third good remaining fixed in amount.

The following notations are required:

$$\sigma = \frac{R^y_x R^z_x}{xyz} \quad \frac{x + R^y_x y + R^z_x z}{\begin{vmatrix} 1 & R^y_x & R^z_x \\ \dfrac{\partial}{\partial x} R^y_x & \dfrac{\partial}{\partial y} R^y_x & \dfrac{\partial}{\partial z} R^y_x \\ \dfrac{\partial}{\partial x} R^z_x & \dfrac{\partial}{\partial y} R^z_x & \dfrac{\partial}{\partial z} R^z_x \end{vmatrix}}.$$

The coefficient σ is positive from the condition (9); it is independent of units and symmetrical with respect to x, y and z. Further, it denotes the mutual substitutability of the three goods and, if the indifference surface system exists, it measures the curvature of the surface passing through any point.

Consider now one good, say X, apart from the other two. The elasticity of substitution between Y and Z is

$$\frac{d\left(\frac{y}{z}\right)}{\frac{y}{z}} \quad \text{divided by} \quad \frac{dR^z_y}{R^z_y},$$

where the differential can be taken along any one of the three perpendicular indifference directions at the point (x,y,z). There are thus three elasticities of substitution between Y and Z which we can denote by ${}_{yz}\sigma_{yz}$, ${}_{xz}\sigma_{yz}$ and ${}_{xy}\sigma_{yz}$, according as it is taken along the YZ indifference direction (X constant), along the XZ indifference direction (Y constant), or along the XY indifference direction (Z constant). Evaluating:

$${}_{yz}\sigma_{yz} = -\frac{R_y^z}{yz} \frac{y + R_y^z z}{\begin{vmatrix} 1 & R_y^z \\ \frac{\partial}{\partial y} R_y^z & \frac{\partial}{\partial z} R_y^z \end{vmatrix}} \text{ which is } \textit{positive},$$

$${}_{xz}\sigma_{yz} = \frac{R_y^z}{z \begin{vmatrix} 1 & R_x^z \\ \frac{\partial}{\partial x} R_y^z & \frac{\partial}{\partial z} R_y^z \end{vmatrix}} \text{ and } {}_{xy}\sigma_{yz} = \frac{-R_y^z}{y \begin{vmatrix} 1 & R_x^y \\ \frac{\partial}{\partial x} R_y^z & \frac{\partial}{\partial y} R_y^z \end{vmatrix}}.$$

All these elasticities are independent of units. The first ${}_{yz}\sigma_{yz}$ is symmetrical with respect to y and z and measures the ordinary elasticity of substitution between Y and Z (X being now fixed in amount). The other two elasticities are new and can be positive or negative; ${}_{xz}\sigma_{yz}$ measures the elasticity of substitution between Y and Z when the relation between these goods varies on account of a substitution of X for Z, Y remaining fixed in amount, and similarly for ${}_{xy}\sigma_{yz}$. There are three similar elasticities when Y is considered apart from XZ and three more when Z is considered apart from XY.

3. The form of the individual's complex of preferences is described by twelve indices, all of which are expressed in terms of first-order variations of R_x^y and R_x^z. The indices refer only to the complex of preferences and not to market conditions. The twelve *indices of the complex of preferences* can be divided into three sets:

(1) *The elasticity of substitution between X and the pair YZ*

$$= \frac{\sigma}{{}_{yz}\sigma_{yz}}$$

and two similar elasticities $\frac{\sigma}{{}_{xz}\sigma_{xz}}$ and $\frac{\sigma}{{}_{xy}\sigma_{xy}}$. All three elasticities are positive. In general terms, $\frac{\sigma}{{}_{yz}\sigma_{yz}}$ is the mutual elasticity of the triad X, Y and Z reduced by the elasticity of substitution of Y and Z between themselves. The elasticity can be large, therefore, if the triad is a highly substitutable one (σ large) or if Y and Z themselves are hardly substitutable at all (${}_{yz}\sigma_{yz}$ small).

(2) *The elasticity of complementarity of Y with X against Z*

$$= \frac{\sigma}{{}_{xz}\sigma_{yz}}$$

and *the elasticity of complementarity of Z with X against Y*

$$= \frac{\sigma}{{}_{xy}\sigma_{yz}}.$$

In these elasticities σ is again reduced by one of the elasticities of substitution between Y and Z—the new ones in this case. The signs of the elasticities of complementarity can be positive or negative, and these will be interpreted later in terms of the competitive and complementary nature of the relations between X, Y and Z. There are four other and similar elasticities of complementarity:

$$\frac{\sigma}{{}_{yz}\sigma_{xz}}\ ;\ \frac{\sigma}{{}_{xy}\sigma_{xz}}\ ;\ \frac{\sigma}{{}_{yz}\sigma_{xy}}\ ;\ \text{and}\ \frac{\sigma}{{}_{xz}\sigma_{xy}}.$$

(3) *The coefficients of income-variation*:

$$\rho_x = \frac{yz}{R^y_x R^z_x}\begin{vmatrix} \frac{\partial}{\partial y}R^y_x & \frac{\partial}{\partial z}R^y_x \\ \frac{\partial}{\partial y}R^z_x & \frac{\partial}{\partial z}R^z_x \end{vmatrix}\ ;\ \rho_y = -\frac{xz}{R^y_x R^z_x}\begin{vmatrix} \frac{\partial}{\partial x}R^y_x & \frac{\partial}{\partial z}R^y_x \\ \frac{\partial}{\partial x}R^z_x & \frac{\partial}{\partial z}R^z_x \end{vmatrix}$$

and $$\rho_z = \frac{xy}{R^y_x R^z_x}\begin{vmatrix} \frac{\partial}{\partial x}R^y_x & \frac{\partial}{\partial y}R^y_x \\ \frac{\partial}{\partial x}R^z_x & \frac{\partial}{\partial y}R^z_x \end{vmatrix}.$$

These coefficients are the co-factors (adjusted to be independent of units) of the first row of the positive third-order determinant given in (9). It follows that they cannot be all negative; they are all positive in the "normal" case, and either one or two of them are negative in the "exceptional" cases.

The three indices of (1) and the six indices of (2) refer only to the indifference directions at the point (x,y,z), i.e. to a single indifference surface (if the system exists). The three indices of (3) refer to variations from one set of indifference directions to another and adjacent set, or from one indifference surface to another and adjacent surface.

4. *The individual demand functions.*—If the individual spends a given money income μ on the three goods X, Y and Z at given uniform market prices p_x, p_y and p_z, then his purchases in equilibrium are given by the conditions:

$$xp_x + yp_y + zp_z = \mu \text{ and } \frac{1}{p_x} = \frac{R^y_x}{p_y} = \frac{R^z_x}{p_z} \quad ....(10).$$

If the indifference surface system exists, these equations correspond to the diagrammatic condition that the individual's equilibrium purchases are the co-ordinates of the point in XYZ space where the given price plane ($xp_x + yp_y + zp_z = \mu$) touches an indifference surface. The equations (10) suffice to determine x, y and z as functions of μ, p_x, p_y and p_z—the individual *demand functions*. These functions are single-valued since the assumption (9) implies that a unique equilibrium position exists for any set of μ, p_x, p_y and p_z.

Let $\kappa_x = \frac{xp_x}{\mu}$, $\kappa_y = \frac{yp_y}{\mu}$ and $\kappa_z = \frac{zp_z}{\mu}$ denote the proportions of total income spent on X, Y and Z respectively ($\kappa_x + \kappa_y + \kappa_z = 1$). For convenience, denote

$$D = \begin{vmatrix} p_x & p_y & p_z \\ \frac{\partial}{\partial x} R^y_x & \frac{\partial}{\partial y} R^y_x & \frac{\partial}{\partial z} R^y_x \\ \frac{\partial}{\partial x} R^z_x & \frac{\partial}{\partial y} R^z_x & \frac{\partial}{\partial z} R^z_x \end{vmatrix}.$$

The values, in the equilibrium position, of the various elasticities and coefficients defined above are:

$$\left.\begin{aligned} \sigma &= \frac{\mu}{xyz}\frac{p_y p_z}{p_x^2}\frac{1}{D}\,; \quad {}_{yz}\sigma_{yz} = \frac{-\frac{\mu(1-\kappa_x)}{yz}\frac{p_z}{p_y}}{\begin{vmatrix} p_y & p_z \\ \frac{\partial}{\partial y} R^z_y & \frac{\partial}{\partial z} R^z_y \end{vmatrix}} \quad \text{etc.} \\ {}_{xy}\sigma_{yz} &= \frac{\frac{\mu\kappa_x}{xz}\frac{p_z}{p_y}}{\begin{vmatrix} p_x & p_z \\ \frac{\partial}{\partial x} R^z_y & \frac{\partial}{\partial z} R^z_y \end{vmatrix}}\,; \quad {}_{xz}\sigma_{yz} = \frac{-\frac{\mu\kappa_x}{xy}\frac{p_z}{p_y}}{\begin{vmatrix} p_x & p_y \\ \frac{\partial}{\partial x} R^z_y & \frac{\partial}{\partial y} R^z_y \end{vmatrix}} \quad \text{etc.} \\ \rho_x &= \frac{yzp_x^2}{p_y p_z} D_x\,; \quad \rho_y = \frac{xzp_x^2}{p_y p_z} D_y\,; \quad \rho_z = \frac{xyp_x^2}{p_y p_z} D_z \end{aligned}\right\} \quad \ldots(11),$$

where D_x, D_y and D_z are the co-factors of the first row of D. The problem of the variation of the demand functions, as income or as prices vary, is treated by the method adopted in the two-goods case.

(*a*) *Income-elasticities of demand.*—Denoting the three income-elasticities of demand by

$$E_\mu(x) = \frac{\mu}{x}\frac{\partial x}{\partial \mu}\,; \quad E_\mu(y) = \frac{\mu}{y}\frac{\partial y}{\partial \mu}\,; \quad E_\mu(z) = \frac{\mu}{z}\frac{\partial z}{\partial \mu},$$

differentiate (10) partially with respect to μ:

$$\left.\begin{aligned} xp_x\,E_\mu(x) + yp_y\,E_\mu(y) + zp_z\,E_\mu(z) &= \mu \\ x\frac{\partial}{\partial x}R^y_x E_\mu(x) + y\frac{\partial}{\partial y}R^y_x E_\mu(y) + z\frac{\partial}{\partial z}R^y_x E_\mu(z) &= 0 \\ x\frac{\partial}{\partial x}R^z_x E_\mu(x) + y\frac{\partial}{\partial y}R^z_x E_\mu(y) + z\frac{\partial}{\partial z}R^z_x E_\mu(z) &= 0 \end{aligned}\right\}\ldots(12).$$

Solving the equations (12) in determinant form,

$$\frac{xE_\mu(x)}{D_x} = \frac{yE_\mu(y)}{D_y} = \frac{zE_\mu(z)}{D_z} = \frac{\mu}{D}.$$

Substituting the values of the various expressions given by (11),

$$E_\mu(x) = \sigma\,.\,\rho_x;\ E_\mu(y) = \sigma\,.\,\rho_y;\ E_\mu(z) = \sigma\,.\,\rho_z \ldots\ldots\ldots\ldots(13).$$

From the first equation of (12) we have a relation between the income-elasticities and hence between ρ_x, ρ_y and ρ_z:

$$\left.\begin{aligned} \kappa_x E_\mu(x) + \kappa_y\,E_\mu(y) + \kappa_z\,E_\mu(z) &= 1 \\ \kappa_x\rho_x + \kappa_y\rho_y + \kappa_z\rho_z &= \frac{1}{\sigma} \end{aligned}\right\}\ldots\ldots\ldots\ldots(14).$$

It follows that all three income-elasticities cannot be negative. In the "normal" case they are all positive and each demand increases with increasing income. In the "exceptional" cases one (or two) of the income-elasticities is negative and the demand for one (or two) of the goods decreases with increasing income. A good is said to be *inferior* if its demand decreases with increasing income, and it is possible, therefore, for one or two of a set of three goods to be inferior in this sense.

Since the income-elasticities of demand are positive multiples of the third set of indices, they can be used instead of the latter to characterise the individual's complex of preferences.

(*b*) *Price-elasticities of demand.* Denoting the p_x-elasticities of demand by

$$E_{px}(x) = -\frac{p_x}{x}\frac{\partial x}{\partial p_x};\ E_{px}(y) = -\frac{p_x}{y}\frac{\partial y}{\partial p_x};\ E_{px}(z) = -\frac{p_x}{z}\frac{\partial z}{\partial p_x},$$

differentiate (10) partially with respect to p_x:

$$\left.\begin{aligned} xp_x\,E_{px}(x) + yp_y\,E_{px}(y) + zp_z\,E_{px}(z) &= xp_x \\ x\frac{\partial}{\partial x}R^y_x\,E_{px}(x) + y\frac{\partial}{\partial y}R^y_x\,E_{px}(y) + z\frac{\partial}{\partial z}R^y_x\,E_{px}(z) &= \frac{p_y}{p_x} \\ x\frac{\partial}{\partial x}R^z_x\,E_{px}(x) + y\frac{\partial}{\partial y}R^z_x\,E_{px}(y) + z\frac{\partial}{\partial z}R^z_x\,E_{px}(z) &= \frac{p_z}{p_x} \end{aligned}\right\}\ldots(15).$$

Solving the equations (15) in determinant form:

$$\frac{x\,E_{px}(x)}{\begin{vmatrix} xp_x & p_y & p_z \\ \dfrac{p_y}{p_x} & \dfrac{\partial}{\partial y}R^y_x & \dfrac{\partial}{\partial z}R^y_x \\ \dfrac{p_z}{p_x} & \dfrac{\partial}{\partial y}R^z_x & \dfrac{\partial}{\partial z}R^z_x \end{vmatrix}} = \frac{y\,E_{px}(y)}{\begin{vmatrix} p_x & xp_x & p_z \\ \dfrac{\partial}{\partial x}R^y_x & \dfrac{p_y}{p_x} & \dfrac{\partial}{\partial z}R^y_x \\ \dfrac{\partial}{\partial x}R^z_x & \dfrac{p_z}{p_x} & \dfrac{\partial}{\partial z}R^z_x \end{vmatrix}} = \frac{z\,E_{px}(z)}{\begin{vmatrix} p_x & p_y & xp_x \\ \dfrac{\partial}{\partial x}R^y_x & \dfrac{\partial}{\partial y}R^y_x & \dfrac{p_y}{p_x} \\ \dfrac{\partial}{\partial x}R^z_x & \dfrac{\partial}{\partial y}R^z_x & \dfrac{p_z}{p_x} \end{vmatrix}} = \frac{1}{D},$$

$$\text{i.e. } E_{px}(x) = \frac{yz}{\mu}\frac{p_x^2}{p_y p_z}\,\sigma\left[xp_x\,D_x + \frac{p_y}{p_x}\left\{p_z\frac{\partial}{\partial y}R^z_x - p_y\frac{\partial}{\partial z}R^z_x\right\}\right.$$
$$\left. + \frac{p_z}{p_x}\left\{p_y\frac{\partial}{\partial z}R^y_x - p_z\frac{\partial}{\partial y}R^y_x\right\}\right]$$
$$= \kappa_x\,\sigma\,.\,\rho_x - \frac{yz}{\mu}\frac{p_y}{p_z}\,\sigma\left(p_y\frac{\partial}{\partial z}R^z_y - p_z\frac{\partial}{\partial y}R^z_y\right),$$

using the expressions (11) and making the transformation $R^z_x = R^z_y . R^y_x$ together with the equilibrium equations (10). Hence, from (11) and (13),

$$E_{px}(x) = \kappa_x E_\mu(x) + (1 - \kappa_x)\frac{\sigma}{{}_{yz}\sigma_{yz}}.$$

By an exactly similar procedure, we obtain

$$E_{px}(y) = \kappa_x E_\mu(y) + \kappa_x\frac{\sigma}{{}_{xz}\sigma_{yz}} \text{ and } E_{px}(z) = \kappa_x E_\mu(z) + \kappa_x\frac{\sigma}{{}_{xy}\sigma_{yz}}.$$

Similar sets of results can be obtained for the p_y-elasticities and for the p_z-elasticities of demand. Hence:

$$\left.\begin{aligned} E_{px}(x) &= \kappa_x E_\mu(x) + (1 - \kappa_x)\frac{\sigma}{{}_{yz}\sigma_{yz}} \\ E_{px}(y) &= \kappa_x E_\mu(y) + \kappa_x\frac{\sigma}{{}_{xz}\sigma_{yz}} \\ E_{px}(z) &= \kappa_x E_\mu(z) + \kappa_x\frac{\sigma}{{}_{xy}\sigma_{yz}} \\ &\text{and two similar sets of three equations} \end{aligned}\right\} \quad \text{...............(16).}$$

Each price-elasticity of demand thus consists of two terms, the first term being a multiple of the third set of indices of the complex of preferences (the coefficients of income-variation) and the second term being a multiple of the first and second set of indices (the elasticities of substitution and complementarity).

One relation can be found between each of the three sets of price-elasticities of demand. From the first equation of (15),

$$\left.\begin{array}{c} \kappa_x E_{px}(x) + \kappa_y E_{px}(y) + \kappa_z E_{px}(z) = \kappa_x \\ \text{and two similar relations} \\ \text{Hence, } (1 - \kappa_x)\dfrac{\sigma}{{}_{yz}\sigma_{yz}} + \kappa_y \dfrac{\sigma}{{}_{xz}\sigma_{yz}} + \kappa_z \dfrac{\sigma}{{}_{xy}\sigma_{yz}} = 0 \\ \text{and two similar relations} \end{array}\right\} \quad \ldots\ldots(17).$$

The three relations of the type (17) between the indices of the first and second sets imply, amongst other things, that the elasticities of substitution can be obtained in terms of the elasticities of complementarity. Further, since $\dfrac{\sigma}{{}_{yz}\sigma_{yz}} > 0$, both $\dfrac{\sigma}{{}_{xz}\sigma_{yz}}$ and $\dfrac{\sigma}{{}_{xy}\sigma_{yz}}$ cannot be positive. There are, therefore, only two possibilities. *Either* both elasticities of complementarity of Y and Z with X are negative *or* one elasticity is negative and the other positive.

5. A number of important conclusions can be derived from the results (16).[1] The increases and decreases in the various demands that follow a change in any one price are made up of two separate changes, the first due to the change in real income and the second to the substitutions made possible by the change in the relative prices.

The effect of a change in the price of a good on the demand for the *same* good is clear. The change is measured by an elasticity of the form $E_{px}(x)$ and this is positive in almost all cases. The demand for a good is thus increased by a fall in its price. It is possible, however, that this result is reversed in very exceptional cases. A price-elasticity of the form $E_{px}(x)$ can be negative and the demand for a good can increase with a *rise* in its price, provided that the income-elasticity of demand for the good is negative and large relative to the substitution effect. Hence, the demand curve for a good X can be rising, in the Giffen-Marshall sense, provided that X is an inferior good and that a large proportion of total income is spent on X for which no ready substitutes are available.

The effect of a change in the price of a good on the demands for other goods is more involved, and it is here that we must look for observable evidence of the "competitive" or "complementary" nature of the relations between the three goods.

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[1] For a complete account of these conclusions, see the first part of this article by Dr. Hicks, ECONOMICA, February 1934, p. 67 and pp. 69 *et seq.*

Consider the three-way substitution made possible by the *relative* price changes apart from the effect of the change in the level of real income. The second terms of the results (16) indicate this substitution effect. The effect of substitution following a fall in the price of X is to increase or decrease the demand for Y according as the elasticity of complementarity of Y with X against Z is positive or negative. *A negative elasticity of complementarity implies that Y competes with X against Z and a positive elasticity that Y complements X against Z.* The signs of the elasticities of complementarity determine the competitive and complementary nature of the relations between the three goods and their magnitudes indicate the extent of the relations.[1] Since both elasticities of complementarity of Y and Z with X cannot be positive, it is impossible that both Y and Z complement X. There must be an element of competition between one good and the other pair. In conclusion, it is important to notice that these competitive and complementary relations depend only on the indices of the individual's complex of preferences, and not on market prices or conditions.

III. THE INTEGRABILITY CASE

1. The development of the previous section was perfectly general and, in particular, it was independent of the existence of an integral of the fundamental differential equation (8). The results to be set out in the present section, on the other hand, hold only in cases where the equation (8) is integrable.

The mathematical condition for integrability imposes a restriction on the form of R_x^y and R_x^z.[2] Assuming that the condition is satisfied, there exists a function index of utility

$$u = F\{\phi(x,y,z)\}$$

where $\phi(x,y,z)$ is any one integral of (8) and F denotes the arbitrary function involved in the general integral. Writing the partial derivatives of $\phi(x,y,z)$ by ϕ_x, ϕ_y and ϕ_z, we have

$$R_x^y = \frac{\phi_y}{\phi_x} \text{ and } R_x^z = \frac{\phi_z}{\phi_x}.$$

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[1] In the complementary case the demands for both X and Y increase at the expense of the demand for Z (apart from the effect of the change in real income). This is why only competitive goods are possible in the two-goods case ; there is no third good to absorb the loss that must occur in substitution.

[2] The condition is $\frac{\partial}{\partial z} R_x^y - \frac{\partial}{\partial y} R_x^z + R_x^y \frac{\partial}{\partial x} R_x^z - R_x^z \frac{\partial}{\partial x} R_x^y = 0$.

The analysis can now be expressed in terms of the function $\phi(x,y,z)$ and its partial derivatives of the first and second orders, remembering that only the ratios of ϕ_x, ϕ_y and ϕ_z are definite. All the results given below, however, can be shown to involve only these ratios or the derivatives of the ratios, and not the functions themselves.

2. *Simplification of the competitive and complementary relations.*—In the integrability case the values of the six elasticities of complementarity are

$$\frac{\sigma}{{}_{xz}\sigma_{yz}} = \frac{x\phi_x + y\phi_y + z\phi_z}{xy}\,\frac{\Phi_{xy}}{\Phi} = \frac{\sigma}{{}_{yz}\sigma_{xz}}$$

$$\frac{\sigma}{{}_{xy}\sigma_{xz}} = \frac{x\phi_x + y\phi_y + z\phi_z}{yz}\,\frac{\Phi_{yz}}{\Phi} = \frac{\sigma}{{}_{xz}\sigma_{xy}}$$

$$\frac{\sigma}{{}_{yz}\sigma_{xy}} = \frac{x\phi_x + y\phi_y + z\phi_z}{xz}\,\frac{\Phi_{xz}}{\Phi} = \frac{\sigma}{{}_{xy}\sigma_{yz}},$$

where—Φ stands for the negative and symmetrical determinant

$$\begin{vmatrix} \phi_{xx} & \phi_{xy} & \phi_{xz} & \phi_x \\ \phi_{xy} & \phi_{yy} & \phi_{yz} & \phi_y \\ \phi_{xz} & \phi_{yz} & \phi_{zz} & \phi_z \\ \phi_x & \phi_y & \phi_z & 0 \end{vmatrix}$$

and Φ_{xy}, Φ_{yz} and Φ_{xz} are the co-factors of ϕ_{xy}, ϕ_{yz} and ϕ_{xz} in the determinant.

Symmetry is, therefore, introduced into the relations between the three goods when the integrability condition is satisfied. For the relation between any pair of goods X and Y (with respect to the third good Z), the elasticity of complementarity of Y with X against Z is equal to the elasticity of complementarity of X with Y against Z. It is now possible to speak of the elasticity of complementarity of the pair XY (against Z):

$$\sigma_{xy} = \frac{\sigma}{{}_{xz}\sigma_{yz}} = \frac{\sigma}{{}_{yz}\sigma_{xz}},$$

and there are only three of these elasticities, σ_{xy}, σ_{yz} and σ_{xz}, instead of the full set of six.[1] The signs of σ_{xy}, σ_{yz} and σ_{xz} determine the competitive and complementary relations of the whole set of three goods. If σ_{xy} is negative X and Y are competitive, if positive X and Y are complementary (with respect to Z in each case). Similar criteria apply to the relation between the other pairs.

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[1] The integrability condition is clearly *sufficient* for this symmetry; it also appears to be a *necessary* condition.

The equations (17) now take the form:

$$(1 - \kappa_x)\frac{\sigma}{{}_{yz}\sigma_{yz}} + \kappa_y \sigma_{xy} + \kappa_z \sigma_{xz} = 0.$$

and two similar relations

Hence, at least two of σ_{xy}, σ_{yz} and σ_{xz} are negative, and it is not possible for more than one pair of the three goods to be complementary. Further, the equations can be solved either to give the elasticities of substitution of the goods in pairs (${}_{yz}\sigma_{yz}$, ${}_{xz}\sigma_{xz}$ and ${}_{xy}\sigma_{xy}$) in terms of the elasticities of complementarity of the goods in pairs (σ_{xy}, σ_{yz} and σ_{xz}), or conversely. The latter is the more interesting solution. We obtain:

$$\sigma_{xy} = \tfrac{1}{2}\,\sigma \left\{ \frac{1}{{}_{xy}\sigma_{xy}}\left(\frac{\kappa_z}{\kappa_x} + \frac{\kappa_z}{\kappa_y}\right) - \frac{1}{{}_{yz}\sigma_{yz}}\,\frac{1-\kappa_x}{\kappa_y} - \frac{1}{{}_{xz}\sigma_{xz}}\,\frac{1-\kappa_y}{\kappa_x} \right\} \quad \ldots(18).$$

and two similar expressions

Hence, the goods X and Y can only be markedly complementary if the term $\frac{1}{{}_{xy}\sigma_{xy}}\left(\frac{\kappa_z}{\kappa_x} + \frac{\kappa_z}{\kappa_y}\right)$ is large compared with the other two terms of the expression (18), i.e. if the elasticity of substitution of the pair XY is small compared with the two similar elasticities, or if κ_z is large compared with κ_x and κ_y, or both. The results stated by Dr. Hicks on this point follow at once.[1]

Consider, finally, the two actual variations in demand:

$$\frac{\partial x}{\partial p_y} = -\frac{xy}{\mu}\{E_\mu(x) + \sigma_{xy}\} \text{ and } \frac{\partial y}{\partial p_x} = -\frac{xy}{\mu}\{E_\mu(y) + \sigma_{xy}\}.$$

Both $\frac{\partial x}{\partial p_y}$ and $\frac{\partial y}{\partial p_x}$ are independent of units and can be compared directly. The two variations are equal only if $E_\mu(x) = E_\mu(y)$, i.e. if an increase in income has the same proportional effect on the demands for the two goods. This may approximate to the actual state of affairs in many cases, but it is certainly not exactly true in general. Further, the two variations are in the same direction (without necessarily being of equal magnitude) either if both income-elasticities are small or if they are large but differ by a small amount.[2] It is, however, quite possible that $\frac{\partial x}{\partial p_y}$ and $\frac{\partial y}{\partial p_x}$ are different, not only in magnitude, but also in sign. The symmetry of the system does not necessarily extend to these two changes in demand.

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[1] Hicks, ECONOMICA, February 1934, p. 73.

[2] It is worth while distinguishing the two alternatives. It is only in the first alternative, where $E_\mu(x)$ and $E_\mu(y)$ are small, that we can say that the common sign of $\frac{\partial x}{\partial p_y}$ and $\frac{\partial y}{\partial p_x}$ is determined by the sign of σ_{xy}. In this case the two variations are positive if

3. *The case of independent goods.*—The three goods form an independent system if the marginal rate of substitution of one good for another depends only on the amounts possessed by the individual of these two goods, i.e. if R^y_x is a function of x and y, R^z_y a function of y and z and R^x_z a function of x and z. It follows at once that each marginal rate of substitution can be expressed as a product of two functions of a single variable, and that we can write:

$$\frac{1}{\phi_x(x)} = \frac{R^y_x}{\phi_y(y)} = \frac{R^z_x}{\phi_z(z)}.$$

The differential equation (8) is

$$\phi_x(x)dx + \phi_y(y)dy + \phi_z(z)dz = 0$$

and this is always integrable. The function index of utility is

$$u = F\{\Phi_x(x) + \Phi_y(y) + \Phi_z(z)\},$$

the general integral of the equation, where

$$\Phi_x(x) = \int \phi_x(x)dx;\ \Phi_y(y) = \int \phi_y(y)dy;\ \Phi_z(z) = \int \phi_z(z)dz.$$

The utility index is, in all its forms, a function of the sum of three functions of a single variable, and the goods X, Y and Z make independent contributions to the utility index. The case of independent goods is thus at least mathematically significant.

It is only in the independent goods case that we can derive anything corresponding to the marginal utility functions and curves of the traditional analysis. The marginal rate of substitution of Y for X is $R^x_y = \phi_x(x) : \phi_y(y)$, and this is a constant times $\phi_x(x)$ when only x varies. The same is true of the marginal rate of substitution of Z for X. There is, therefore, a single-variable function $\phi_x(x)$ which represents the marginal rate of substitution of any good for X for various amounts of X. It is only necessary to multiply the function by a constant depending on which good is substituted for X and on the (fixed) amount of this good possessed by the individual.

Let $E_x(\phi_x) = \frac{x}{\phi_x}\frac{d}{dx}\phi_x$ represent the elasticity of the function

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X and Y are competitive and negative if X and Y are complementary. In the second alternative, though the variations are in the same direction, the direction does not necessarily correspond to the competitive or complementary relation between the pair of goods XY.

$\phi_x(x)$, i.e. the elasticity of the marginal rate of substitution of any good for X taken for variations in the amount possessed of X. In the same way we can obtain two other elasticities, $E_y(\phi_y)$ and $E_z(\phi_z)$. Each of these three elasticities is perfectly definite, being independent of units, of which good is substituted for the one named and of the amount of the substituted good that happens to be possessed. The elasticities correspond to the elasticities of the marginal utility functions or curves of Pareto's theory of value. If the signs of all $E_x(\phi_x)$, $E_y(\phi_y)$ and $E_z(\phi_z)$ are negative we have the case of " decreasing marginal utility " in Pareto's sense. It is, however, not necessary that this case should obtain for all sets of independent goods.

In the case of independent goods the following equilibrium values of the fundamental coefficients are obtained:

$$\sigma = \frac{1}{E_x E_y E_z}\,\frac{1}{K};\quad {}_{yz}\sigma_{yz} = -\,\frac{1-\kappa_x}{E_y E_z}\,\frac{1}{K-\dfrac{\kappa_x}{E_x}}\ \text{etc.};$$

$${}_{xz}\sigma_{yz} = {}_{yz}\sigma_{xz} = \frac{1}{E_z}\ \text{etc.};\quad \rho_x = E_y E_z\ \text{etc.},$$

where $K = \dfrac{\kappa_x}{E_x} + \dfrac{\kappa_y}{E_y} + \dfrac{\kappa_z}{E_z}$ and E_x stands for $E_x(\phi_x)$, and so on.

The equilibrium values of the twelve indices of the individual's complex of preferences are:

(1) the elasticities of substitution are

$$\frac{\sigma}{{}_{yz}\sigma_{yz}} = -\,\frac{1}{1-\kappa_x}\,\frac{1}{E_x}\left(1 - \frac{\kappa_x}{E_x}\,\frac{1}{K}\right).$$

and two similar expressions, all being positive

(2) the elasticities of complementarity are

$$\sigma_{xy} = \frac{1}{E_x E_y}\,\frac{1}{K} = \sigma E_z.$$

and two similar expressions

(3) the coefficients of income-variation are

$$\rho_x = E_y E_z;\ \rho_y = E_x E_z \text{ and } \rho_z = E_x E_y,$$

and so $E_\mu(x) = \sigma E_y E_z$; $E_\mu(y) = \sigma E_x E_z$ and $E_\mu(z) = \sigma E_x E_y$.

The indices are all determined by the three elasticities E_x, E_y and E_z. There must, therefore, be a number of relations between them. As in the general integrability case the elasticities of substitution can be expressed in terms of the elasticities of complementarity, or conversely, by means of equations (18). In the independent goods case, however, there is a further set of relations between the indices. The coefficients of income-variation, and hence the income-elasticities of demand, can be expressed in terms of the elasticities of complementarity also. We have:

$$E_\mu(x) = \frac{\sigma_{xy}\sigma_{xz}}{\sigma}\ ;\ E_\mu(y) = \frac{\sigma_{xy}\sigma_{yz}}{\sigma} \text{ and } E_\mu(z) = \frac{\sigma_{xz}\sigma_{yz}}{\sigma} \quad \ldots(19).$$

As in the integrability case at least two of σ_{xy}, σ_{yz} and σ_{xz} must be negative. Since $\sigma_{xy} = \sigma E_z$, $\sigma_{yz} = \sigma E_x$ and $\sigma_{xz} = \sigma E_y$ (σ being positive), at least two of E_x, E_y and E_z must also be negative. There are thus only two possibilities; *either* all E_x, E_y and E_z are negative, *or* one of them is positive and the other two negative.

(1) When E_x, E_y and E_z are all negative we have the case of "decreasing marginal utility." From the expressions above all the elasticities of substitution are positive, all the elasticities of complementarity are negative, and all the coefficients of income-variation are positive. It follows that all the income-elasticities of demand are positive. Further, from the results (16), $E_{px}(x)$, $E_{py}(y)$ and $E_{pz}(z)$, i.e. the demand elasticities with respect to the price of the good concerned, are also all positive. The three goods compete with each other in pairs and there is no possibility of "exceptional" behaviour of any kind.

(2) When E_x is positive and E_y and E_z are negative we have the case where one good has "increasing marginal utility." Since σ must be positive there is one restriction in this case:

$$\frac{\kappa_x}{E_x} > \frac{\kappa_y}{-E_y} + \frac{\kappa_z}{-E_z}.$$

The elasticity of complementarity of the pair YZ is now positive, and the other two elasticities are negative. Of the income-elasticities of demand only $E_\mu(x)$ is positive and the other two are negative. In this case both Y and Z are inferior to X, and they complement each other while competing separately with X. The p_x-elasticities of demand are all definite in sign from (16), $E_{px}(x)$ being positive and the other two negative. A fall in the price of the superior good X increases the demand for the good at the expense of a decrease in the demand for each of the inferior goods. The other price-elasticities can be of either sign and, in particular, rising demand curves for Y and Z are possible.

The independent goods case includes a case of perfectly "normal" relationship between X, Y and Z. But it also includes a case where a pair of goods is inferior to, and complement each other against, the third good. It is, therefore, not sufficient to take the goods as an independent set if it is desired to give a simple analytical treatment (as a first approximation) of the case of three goods "normally" related. One additional condition is necessary for this, the condition that the elasticities of the marginal rates of substitution are all negative.[1]

To return to the case of two goods for a moment, the only definition of two independent goods that can be given is that the marginal rate of substitution divides into two functions of a single variable : $R_x^y = \frac{\phi_y(y)}{\phi_x(x)}$. There are again two possibilities. *Either* $E_x(\phi_x)$ and $E_y(\phi_y)$ are both negative, in which case the income-elasticities of demand are both positive. *Or* $E_x(\phi_x)$ and $E_y(\phi_y)$ are of opposite signs, in which case the income-elasticities of demand are also of opposite signs. But these two possibilities cover all the cases that *can* arise when there are only two goods. The case of two independent goods is thus no more restricted (in general terms) than the complete case, and any relationship between two goods can be represented, at least approximately for small variations, by the independent relationship. The two-goods case can be treated perfectly well by assuming independence from the beginning.[2] This is not

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[1] Only *one* condition is required here since two of the three elasticities are negative in any case.

[2] See Hicks, ECONOMICA, February 1934, pp. 75-6. In the case of two independent goods X and Y, the two fundamental elasticities are $E_x(\phi_x)$ and $E_y(\phi_y)$. The former is the elasticity (X variable) of the marginal rate of substitution of Y for X, or (broadly) the elasticity of the marginal utility of X. The other elasticity is similarly interpreted. All demand elasticities are expressed in terms of E_x and E_y; in particular

$$E_\mu(x) = -\sigma E_y \text{ and } E_\mu(y) = -\sigma E_x,$$

where $\sigma = -\frac{1}{E_x E_y} \frac{1}{\frac{\kappa_x}{E_x} + \frac{\kappa_y}{E_y}}$, the elasticity of substitution between X and Y.

These remarks throw some light upon the meaning of Professor Frisch's "money flexibility" (*New Methods of Measuring Marginal Utility*, 1932). Professor Frisch, in effect, takes X as one particular commodity (say sugar) and Y as the group of all other commodities. Then E_y is the elasticity of the marginal rate of substitution of sugar for all other commodities when the expenditure on the latter varies. This is the elasticity of the marginal utility of all other commodities, i.e. of money income. Hence, Professor Frisch's money flexibility is E_y. It follows, for example, that income-elasticity of demand for sugar is the product of the elasticity of substitution between sugar and all other commodities and the numerical value of money flexibility. The question arises whether the value of E_y is independent of the choice of X. If this is the case, as Professor true in the case of more than two goods, and here the case of independence is definitely more restricted than the general case (even if integrability is assumed), and must be treated as such.

4. *Notes on the " degrees of freedom " of the system.*—Three cases of the relationship between three or more goods have been considered:

(*a*) The general case.
(*b*) The case where the integrability condition is satisfied and a utility function index exists.
(*c*) The case of independent goods.

It is proposed to add a number of concluding remarks on the way in which the number of " degrees of freedom " of the system is decreased as we proceed from the general to the more particular cases. The meaning of the term " degrees of freedom " will be apparent from the nature of these remarks.

(*a*) In the general case it is found that three relations (17) exist between the elasticities of substitution and of complementarity and one relation (14) between the coefficients of income-variation. The restrictions (9) are only inequalities and do not affect the independence of the indices. There are thus *eight independent indices of the individual's complex of preferences* and these can be taken as the six elasticities of complementarity and two of the coefficients of income-variation.

The variation of individual demand for changes in income or in the market prices is described by twelve income and price-elasticities of demand. By the relations (14) and (17) one income-elasticity and three price-elasticities depend on the others. There are thus eight independent elasticities of demand and the eight independent indices account for these. The general case, therefore, has eight degrees of freedom.

(*b*) The integrability case introduces symmetry into the system. The six elasticities of complementarity are reduced to three, and there are now only *five independent indices of the individual's complex of preferences*. These can be taken, for example, as the three elasticities of complementarity and two coefficients of income-variation. There is a reduction of three in the number of degrees of freedom in the system. On the demand side this must be paralleled by three relations between the eight independent elasticities of demand. These relations

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Frisch claims, the income-elasticity of demand for any commodity is a constant multiple of the elasticity of substitution between this and all other commodities.

are provided by the symmetry of the system and are, from the equations (16),

$$\frac{1}{\kappa_x} E_{px}(y) - \frac{1}{\kappa_y} E_{py}(x) = E_{\mu}(y) - E_{\mu}(x)$$

and two similar relations. As we found, these relations provide a means of comparing $E_{px}(y)$ and $E_{py}(x)$, and so on.

The fact that there are five degrees of freedom in the system is also shown by the number of second-order derivatives of $\phi(x,y,z)$. There are six of these derivatives and one is not independent since the integrability condition must be satisfied. The remaining five are independent and describe the system.

(*c*) The further particular case of a set of three independent goods introduces two further restrictions. From the equations (19), it follows that the two independent coefficients of income-variation are expressible in terms σ_{xy}, σ_{yz} and σ_{xz}, and are no longer independent. There are now only *three independent indices of the individual's complex of preferences.* These can be taken as σ_{xy}, σ_{yz} and σ_{xz}. Alternatively, since all indices can be expressed in terms of the definite elasticities $E_x(\phi_x)$, $E_y(\phi_y)$ and $E_z(\phi_z)$, these can be taken to represent the three independent indices. There are thus three degrees of freedom in the system.

On the demand side, in addition to the relations of the integrability case, there are two relations connecting the income-elasticities and the price-elasticities. Hence, of the elasticities of demand, only three are independent (e.g. the p_x-elasticities), and these are accounted for by the three independent indices. This is checked by the fact that there are only three non-zero second-order derivatives of the function $\phi(x,y,z) = \Phi_x(x) + \Phi_y(y) + \Phi_z(z)$.

Finally, the independent goods case with one additional condition can be used to describe a case of three goods related in a perfectly " normal " way. Since the additional condition takes the form of an inequality there is no further reduction in the number of degrees of freedom. The case of independent goods " normally " related is still described by three independent indices and still displays three degrees of freedom.

The Movement of Labour into South-East England
1920-32[1]

By Brinley Thomas

The geographical redistribution of labour which has taken place in Great Britain since the beginning of the 'twenties is a phenomenon of considerable economic interest. In a period which has witnessed momentous changes in technique and in consumer's demand as well as business fluctuation of unexampled severity, the problem of the mobility of labour has assumed increasing significance. The possibilities of obtaining statistical measurement of internal migration in this country are rather limited. For pre-war decades the Birthplaces figures of the population census can be used to give a rough indication of movements every ten years. Unfortunately this valuable part of the census was sacrificed on the altar of economy both in 1921 and 1931. From this point of view our population statistics now compare very unfavourably with those of countries like France, Germany and Sweden. In the absence of census data it is all the more necessary to take full advantage of the information yielded by the Unemployment Insurance System. The following analysis has been made possible through the courtesy of the officials of the Ministry of Labour.[2] Its object is twofold: to measure the influx of insured labour into the South-Eastern Division (taking its Ministry of Labour boundaries) from the seven other Divisions during the period 1920-32, and to examine the nature of the industrial expansion in the South-East which is responsible for this migration.

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[1] The substance of this article was read as a contribution to a symposium on the Location of Industries before Section F of the British Association in September 1932.

[2] I am indebted to the Ministry of Labour authorities for so readily giving their sanction for the inquiry and to the chief officials of the South-Eastern Division for the admirable way in which they presented the results of the Division of Origin Return covering 114 Offices in July 1932. My thanks are also due to the Statistics Branch of the Ministry of Labour for kindly allowing me to have access to figures giving the insured population of various industries within the South-Eastern Division. The advice of the chief officials of the Statistics Department of the Ministry, and of the South-Eastern Division, has been of great assistance to me. I take sole responsibility for the use and interpretation of the figures.

I. The Statistical Data

The Ministry of Labour divides the country into eight administrative areas. The South-Eastern Division comprises London (which is roughly Greater London) and the counties of Bedford, Buckingham, Cambridge, Essex, Hertford, Kent, Middlesex, Norfolk, Suffolk, Surrey and Sussex. Separate figures are available for the metropolis and the surrounding counties and we shall call these sub-divisions London and the Counties. The other Divisions are the South-West, Midlands, North-East, North-West, Scotland, Wales and Northern Ireland.[1]

Since 1920, when the new comprehensive Unemployment Insurance scheme was launched, unemployment books have been filed at the Claims and Record Office at Kew according to their Office of Origin. This implies that when the annual exchange of books takes place the name of the Office of Origin is transferred from the old book to the new one. When a book is exchanged at an office other than that in which it was originally issued it is described as " foreign." It is this administrative practice which makes it possible to use Ministry of Labour records for a study of internal migration. In order to examine movement into the South-East, only those " foreign " books whose Office of Origin is situated outside this Division are taken into account. A special Division of Origin Return was furnished in respect of 114 Offices (with attached Juvenile Employment Bureaux) in July 1932. These cover the whole of the South-Eastern Division, i.e. London and the Counties, with the exception of rural Offices with an insured population of less than 3,000. The term " foreign " will here be used exclusively in the sense of foreign to the South-Eastern Division.

Several qualifications must be made before this material can be used for statistical purposes. The insured population of an Exchange Office is the total of unemployment insurance books which are exchanged there each year. It is sometimes convenient for the Head Offices of large firms employing people in different parts of London and even in the provinces to send their workers' books in bulk to one Office. This practice alone is sufficient to rule out the possibility of examining the migration of insured labour *within* an area like London. For the purpose of this inquiry all that is necessary is to exclude books belonging to firms owning establishments in the provinces if they have exchanged all their employees' books centrally in London. On this account 27,400 books were left out. It must be added that the number insured at any Office cannot always be related to the number registered as unemployed there. The Office where a man gets his benefit is not necessarily the Office where his book has been exchanged.[1]

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[1] The boundaries of these Divisions are given in the Appendix.

The analysis also assumes that the Office where a person obtains his first insurance book is an indication of the locality where he began to work. Immediately after the war a large number of books were issued to ex-members of the Forces direct from Kew. Obviously this category, which was estimated to number about 65,000 in the South-East in 1932, must also be excluded. There is no way of discovering how they are distributed over the Division. The simplest method of making the correction is to deduct from the total of books exchanged at each Office a percentage corresponding to the proportion of the Kew category to the insured population of the whole Division.

The process of exchanging books, which begins in the first week of July, is practically over in about three weeks; but there are always technical difficulties, e.g. in connection with seamen's books, which postpone the estimate for the year until August or September. The Return, on which this inquiry is based, relates to the volume of books which had been dealt with in the three weeks ended July 23rd, 1932. This was about 94 per cent. of the estimated number of books current in the South-Eastern Division. But in view of the exclusion of the above-mentioned two categories of books together with the small rural Offices, the proportion of the insured population of the South-East for which Division of Origin particulars are available is about 84 per cent., close on 2,821,000 books. The remaining 16 per cent. probably has less significance from the point of view of immigration than the actual figure suggests.

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[1] For this reason the Local Unemployment Index for certain places has to be calculated by relating an estimate of the number insured in the corresponding Local Authority area to an unemployment figure obtained by an actual count of the registered unemployed living there.

Within these limitations the inquiry gives an approximately accurate measurement of the number of insured workers who migrated into the South-East from the rest of the country in the period 1920-32. There can be little doubt that the figures underestimate the actual inflow of insured labour. Persons who took out an insurance book after they had moved into the Division, as might often happen with juveniles, do not appear in our total of migrants. It happens sometimes that a parent moves to a more prosperous area because his children have a better chance of getting jobs. No light can be thrown on the extent of a book's movement before it crossed the border into the South-Eastern Division to remain there until 1932; nor can it be shown at what time during the period the migration took place.[1]

II. The Volume and Direction of the Influx

The total number of books exchanged[2] in the South-Eastern Division (relevant to this analysis) in the three weeks ended July 23rd, 1932, was 2,820,688; and among these there were 129,146 " foreign " books or a proportion of 4·6 per cent. London absorbed 82,864 or 4·0 per cent. of its total and the Counties 46,282 or 6·3 per cent. of their total. The absorption rate of the Counties is thus appreciably higher than that of London. There is a decided range in the rates of the individual Exchange Offices, from 28·7 per cent. in Dagenham at one extreme to 1·0 per cent. in Stepney at the other. The percentages indicate degrees of absorption[3] and as such they are of importance irrespective of the absolute number of books they represent. The median is 4·35 and quartiles 2·9 and 7·3: the modal group is the 3·0 to 3·9 which includes twenty-one Offices.

The spectacular absorption centres[4] are Dagenham 28·7 per cent., Dover 19·5 per cent., Slough 15·6 per cent., Welwyn 13·9 per cent., Canterbury 12·8 per cent., Harrow

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[1] For further observations on the use of Exchange of Books material for studying Labour Mobility, see the author's article " Labour Mobility in the South Wales and Monmouthshire Coal-mining Industry, 1920-30," *Economic Journal*, June 1931.

[2] See Table I.

[3] See Table III. The absorption rate of an Exchange Office is obtained from the total number of books exchanged and the number of " foreign " books among them. But it would be unwarrantable to assume that this is a true index of the expansion of employment within the area administered by the Office. Even apart from the practice of bulk exchange of books, there is always a small proportion of the insured population of an Office who actually work in some other area. Recognition of this fact does not seriously affect the usefulness of the absorption percentages.

[4] See Table IV.

13·0 per cent., Hendon 13·1 per cent., Sutton 11·0 per cent., Southall 11·4 per cent., Hounslow 10·5 per cent., St. Albans 10·5 per cent., Letchworth 9·7 per cent.

It is of some interest to glance at this migration of labour from the point of view of the contributing Divisions. The totals of "foreign" books originating in each of the Divisions are as follows:

Division of Origin	"Foreign"[1] Books.	Average Insured Population 1927-31	Per 1,000 of the Average Insured Population 1927-31
			Per 1,000
South-West	24,816	844,000	29
Midlands	20,748	1,803,000	12
North-East	31,562	2,002,000	16
North-West	20,437	2,142,000	10
Scotland	10,901	1,292,000	8
Wales	24,089	596,000	40
Northern Ireland ...	753	260,000	3
Total Foreign ...	133,306	8,939,000	15

The figures are interesting as absolute totals. Of the total number of migrants 24 per cent. came from the North-East, 19 per cent. from the South-West, 18 per cent. from Wales, 15½ per cent. from the Midlands, 15 per cent. from the North-West and 8 per cent. from Scotland. A proper comparison is obtained by expressing these exports of labour as a proportion of the insured population of the Divisions supplying them. I have taken as the appropriate base the average insured population in the period 1927-31, on the assumption that the bulk of the migration, at least from the depressed areas, took place during recent years. This assumption is borne out by the statement in the Preliminary Report of the 1931 Census that the southward movement of population "has been somewhat precipitate; from current indexes of migration like electoral records, etc., it appears to have been concentrated mainly in the latter half of the decennium."[2]

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[1] This total of 133,306 "foreign" books is larger than the total previously given, because it includes "foreign" books exchanged after July 23rd at certain Offices which had not completed their work at that date. For the purpose of calculating rates of absorption it is safer to consider all Offices according to the number of books they had dealt with up to July 23rd. But in examining the migration from the point of view of the contributing Divisions, it is legitimate to use the larger and, for this analysis, definitive total of "foreign" books.

[2] *Census of England and Wales*, 1931, Preliminary Report, p. xviii.

It is significant that from Wales no less than 40 per 1,000 have migrated to the South-East: one out of every twenty-five persons insured in the Principality has found his way there. The movement from the South-West, too, has been surprisingly heavy, viz. 29 per 1,000. The South-Western Counties have, of course, been a traditional source from which London has recruited population. The relative place occupied in the Table by the North-West (where Lancashire predominates), viz. 10 per 1,000, suggests immobility, for it is not much above Scotland (8 per 1,000) and is well below the North-East (16 per 1,000). The Midlands figure (12 per 1,000) reflects the comparative prosperity of that area and it stands out in notable contrast to those of the South-West and Wales.

Table VI exhibits the distribution of the migrants as between London and the Counties. Out of a total of 133,306 well over a third settled in the Counties. A glance at Table II shows that the motor-car industry at Dagenham has proved a particularly strong magnet. Well over a half of its foreign books came from the North-Western Division, most of them representing bulk movement of skilled workers from the Manchester factories. The high rates at Dover and Canterbury are explained by the rapid development of the Kent coalfield. The majority of the newcomers have been recruited from the South Wales and North-Eastern coal-mining areas. Other prominent centres of absorption are Slough, where many new factories have settled, St. Albans, Harrow and Sutton. Table VI brings out a further interesting fact. The proportion of the Scotch immigrants who settle in London rather than in the Counties is much higher than the average for all the Divisions. Newcomers from the land of the thistle seem to be living up to their ancient tradition of concentrating on the metropolis itself instead of lingering in the outlying districts.

The influx of insured labour into the South-Eastern Division in the period 1920-32, as revealed by this analysis, is 133,300. These migrants were, of course, in many cases accompanied by dependants. This result may be compared with the fact, shown by the recent Population Census,[1] that the region called the South-East, i.e. the counties of Bedford, Berks, Bucks, Essex, Hants, Herts, Kent, Middlesex, Oxford, Surrey, Sussex and London, experienced a net gain by migration of 615,000 in the decade 1921-31. The net increase through migration in Greater London itself amounted to 210,000.

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[1] *Census of England and Wales*, 1931, Preliminary Report, p. xiii.

III. The Nature and Extent of the Industrial Expansion in the South-East

As a counterpart to the foregoing picture of the inflow of labour, it is of the utmost interest to examine the nature and extent of the industrial expansion within the South-East in recent years. For this purpose changes in the insured labour in each industry are regarded as a criterion of expansion or contraction. The Ministry of Labour has kindly placed at my disposal complete figures of the number insured in each of 101 industries in the South-Eastern Division, and separately for London and the Counties, in July 1923 and July 1932. This enables a comparison to be made between the proportion of the total insured population of each industry located in London and the Counties in 1932 and the corresponding proportion in 1923. Whenever the percentage increases it is an indication of relative expansion; when it decreases there is relative contraction. The resultant Tables bring out clearly those trades in which London and the Counties have pushed ahead relatively to the country as a whole. They also show the distribution of activity in each industry as between London and the Counties at the two dates. By thus avoiding comparisons between absolute figures relating to 1923 and 1932, there is no need to make allowance for the disappearance of persons aged sixty-five years and over from unemployment insurance figures in January 1928. It might, of course, happen that the proportion of the total attached to a certain industry qualifying for admission under the scheme as insured persons could be greater or smaller in 1932 than in 1923. In such a case the change in the number of insured persons in the trade would not be an accurate criterion of the actual movement of the labour force. There is, however, ample reason for thinking that this source of error, if at all present, is of a minor character.

The total insured population of Great Britain and Northern Ireland, aged sixteen to sixty-four years, is estimated to have increased by 14·4 per cent.[1] between 1923 and 1932. The increase in the South-Eastern Division in this period was about 25 per cent., the figure for London being 21·4 per cent. and for the Counties 35·9 per cent. The net absolute growth in the number insured in the whole Division may be estimated at 672,000, allowing for the inclusion of persons aged sixty-five and over in the 1923 figure.[1]

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[1] Excluding persons insured under the Special Schemes for the Banking and Insurance industries, for which a geographical analysis is not available.

In 1932 the South-Eastern Division included 27·1 per cent. of the insured population of Great Britain, as compared with 24·9 per cent. in 1923.[2] It is clear that the industrial expansion in the South-East in the last decade is a phenomenon of no little significance: the net increase in the number insured is well in excess of the total insured population of Wales.

It must be observed that legislative changes in the conditions governing the receipt of benefit have had a strong effect on the trend of the numbers insured in different parts of the country in the latter part of our period. To quote the *Ministry of Labour Gazette*: "During the two years 1927-9 the numbers insured in the Southern Section (i.e. the South-Eastern, South-Western and Midlands Divisions) increased by 261,000 and in the Northern Section by only 40,000. In the two years 1929-31, however, the numbers insured in the Southern Section increased by 367,000, while the numbers in the Northern Section, including Wales and Northern Ireland, increased by 305,000. This apparent arrest of the movement from North to South was attributable largely to the retention within the scheme of unemployment insurance, in areas where unemployment was heavy, of numbers of persons who otherwise would have passed out of the scheme if the changes in the conditions for the receipt of benefit introduced by the Unemployment Insurance Act, 1930, had not been made."[3] The effect of the Anomalies Act of 1931 was to counteract this tendency.

The nature of the industrial growth in London and the Counties is brought out in Tables VII-XI. Taking the industries which showed absolute expansion in Great Britain and Northern Ireland in 1923-32, we discover that twenty-seven of them in London and thirty-seven in the Counties expanded more rapidly than in the country as a whole. Table VIII enables us to see which industries relatively advanced

[1] This is done by subtracting 3 per cent. from the 1923 total.

[2] This computation excludes persons insured under the Special Schemes.

[3] See *Ministry of Labour Gazette*, November 1932, p. 409.

both in London and in the Counties: the share of the metropolis in this group increased from 23·3 to 24·0 per cent., and that of the Counties from 8·8 to 9·6 per cent. For the rest the two areas stole a march in different directions. Tables IX and X bring out the fact that London increased its hold on certain trades (which declined relatively in the Counties) from 18·2 to 20·1 per cent., whereas the Counties went ahead in other trades (which declined relatively in London) from 11·5 to 12·5 per cent.

The statistical material, which is set out in detail in the Tables, lends support to the following tentative conclusions:

1. Part of the development has been a projection to the surrounding Counties of industries which were already substantially localised in London. This is clearly shown by the fact that in the case of eight London industries, each of which embraced a proportion ranging between a quarter and over a half of its British total in 1923, the period 1923-32 saw a relative decline in London and a relative expansion in the Counties. They comprise miscellaneous industries and services, electrical wiring and contracting, brushes and brooms, printing and publishing, miscellaneous food, cardboard boxes, electrical cables, scientific and photographic instruments. To these may be added tramway and omnibus services and local government, which are quantitatively important. It is unnecessary to dwell here on the various factors which prompt industries in a large city to migrate to the outlying districts.[1]

2. There are one or two industries which at the beginning of our period were definitely localised in the Counties, e.g. paper and paper board, hats and caps, clay, sand, gravel, etc. These have exhibited a strong degree of relative growth. The same applies as regards London to industries like tobacco, musical instruments, paint, varnish, lead, etc., and furniture.

3. There has been considerable absolute expansion in building and public works contracting, though, with the exception of building in the Counties, there was a relative decline in 1923-32. Many of the transferees from the "depressed areas" have been absorbed into public works in the South-Eastern Division.[2]

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[1] For an analysis of the recent movement of industries within Greater London, see D. H. Smith, *The Industries of Greater London* (1933). Important information may also be found in *The New Survey of London Life and Labour*, volumes ii and v.

[2] Between 1928 and the end of July 1932 a total of 36,370 persons were officially transferred from the "depressed" areas to the South-Eastern Division by the Industrial

4. A diverse maze of miscellaneous light industries has tended to show a preference for the South-East and particularly the Counties. The reasons usually given, e.g. the proximity of a great market, the facilities of the Port of London, and the excellent means of transport for raw material and finished products are doubtless important. The Chief Inspector for Factories and Workshops pointed out in his 1929 Report that "owing to the popularity of modern road transport and the frequent adoption of other forms of power than steam engines, preference is often given to good road communications with the result that many of the new arterial roads have already attracted factories." Cheap and abundant sites and relatively low local rates also play a part. The weight to be attached to different considerations naturally varies from industry to industry. The fact that the South-East has succeeded in attracting such a large share of the new light industries undoubtedly proves that the area on the whole has positive net advantages to offer.

IV. The State and the Location of Industry

The rapid decay which has afflicted many parts of the old industrial North and West has given rise to an urgent demand that the State should interfere to deflect some of the new industrial development to the "depressed areas." It is argued that new factories should be located in areas where "social capital" and a plentiful and immobile labour supply are lying idle. The loss implied by wasted social capital and unemployment relief in the afflicted areas should be included among the factors determining the optimum location. Such State interference would be designed, not to take the choice of location out of the entrepreneur's hands, but to weight the various "pulls" in such a way that he would be led to choose in favour of the "depressed areas."

The theory of the location of industry has, unfortunately, received only very partial attention at the hands of economists. There is very little worthy of notice except the works of the German economists, Launhardt and Alfred Weber. Weber's pure theory of the location of manufacturing industry[1]

Transference Board. This figure inevitably includes duplications; but this is to some extent offset by the fact that the transferees sometimes bring families, members of which may be insured. The total gives no true indication of the number of transferees who have remained in the South-Eastern Division.

[1] See A. Weber's *Theory of the Location of Industries*, English edition by C. J. Friedrich (Chicago University Press, 1929).

adds much to our knowledge; but it has had the effect of keeping this branch of theoretical analysis in a compartment distinct from the general body of economic theory.[1] It could be shown that the peculiar abstract assumptions which Weber made and the basic concepts which he used have made it impossible for subsequent theorists to build on his foundations. He seems to have shunted the theory on to a siding, where it has remained ever since. There are as yet no satisfactory theoretical generalisations which can serve as guides in handling the practical problems of industrial location. This is a field of theory which urgently requires more intensive cultivation.

The desirability of State interference with the choice of location, from a strictly economic point of view, depends on the meaning and importance attached to " social cost." Professor Pigou undoubtedly drew attention to a real problem when he distinguished between his " marginal private net product " and " marginal social net product," though here again it is surprising to what little use these tools of analysis have been put. Those who argue direct from the propositions of abstract theory to the problems of economic policy are apt to forget that in the real world any " optimum " distribution of resources must take place within a social and legal framework. The subject's freedom to choose is a freedom conditioned by this framework. The State has a peculiar double capacity: it is a subject on the market and in this sense stands in the same relation to the " price system " as any other individual subject, while at the same time most of its activities necessarily involve a change in the social and legal environment and therefore in the way in which the equilibrating forces work themselves out. The theorist is usually concerned with the State only in its capacity as one of the parties on the market.[2] But since economic policy invariably implies a change in the social and legal framework, it becomes irrelevant to quote a theoretical argument, one of the basic assumptions of which is a constant social and legal environment. Those who say that " social cost " should be taken into account are thinking of the State in its double capacity. But it is difficult to see how this can be made compatible with the necessary assumptions of ordinary equilibrium theory.

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[1] One of the younger Swedish economists, T. Palander, is about to publish a book on this subject in which he has subjected Weber's theory to an elaborate criticism.

[2] Cf. Mises, *Theorie des Geldes* (1924), p. 223.

A distinction must, therefore, be drawn between two different ways of treating our problem. The first can be best illustrated by quoting Professor Robbins's words: "If we assume that the ends of public policy are the safeguarding of conditions under which individual demands, as reflected in the price system, are satisfied as amply as possible *under given conditions*, then, save in very special circumstances which are certainly not generally known to those who impose such measures, it is legitimate to say that a protective tariff on wheat is uneconomical in that it imposes obstacles to the achievement of this end. This follows clearly from purely neutral analysis."[1] Instead of "a protective tariff on wheat" we may read "State interference to influence the location of industry." Starting from these premises we must admit that a policy of artificially deflecting part of the new development to other areas would be "uneconomical." This is obvious in the case of the two categories of industries noted above, viz. those which have spread out of London, and those which are indigenous either to the metropolis or the Counties. Where there are no preponderating specific factors tying production to the South-East, the argument for intervention might appear more plausible. However, the fact of the expansion of light industries in the South-East is a proof of net advantages from the entrepreneur's point of view; and if this trend were jeopardised in the interests of less favourable locations elsewhere, it would probably mean higher costs.

The above-mentioned end, like every other possible goal of public policy, is open to "value judgment." It is worth noting, however, that State interference is generally regarded as incompatible with the maximum satisfaction of consumers' demands as reflected in the price system; and it is not without significance that the judgments of economists on practical affairs often rest on this "inarticulate major premiss." But, as Professor Robbins says, "To show that under certain conditions demand is satisfied more adequately than under any alternative set of conditions, does not prove that that set of conditions is desirable."[2]

Most other important social ends imply by their very nature a modification of the social framework within which the tendency to equilibrium operates. The most economical disposal of the means for their realisation cannot be discussed on the assumption of given social data. If, for instance, a society aims at a decentralisation of its industries, with a view to a more uniform distribution of its population, this obviously means alterations in local transport rates, taxation, etc. The task of exhibiting what such an end involves is very complicated, for it must show the effects of various postulated changes in the social data on the equilibrating process. The pronouncements of economists are objective just because they elucidate what is implied in the realisation of *given ends*; and the given end is generally a sectional interest. It is only within the narrow sphere where the various interests go hand in hand that the economist can claim anything like absolute validity for his judgments on policy.[1] The tremendous class struggle of our time is being fought over the future of the social framework. It is surely part of the duty of economists to lay bare the economic implications of the programmes of different interests. They are not justified in preaching at a wicked world from a text postulating an end which does not command general allegiance.

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[1] *An Essay on the Nature and Significance of Economic Science*, pp. 129-30. The italics are mine.

[2] *Op. cit.*, p. 127.

No one would deny that the problem of British " depressed " and " derelict " areas makes State interference both inevitable and desirable. Even if our labour supply were completely mobile, the ugly problem of a surplus population in the " places without a future " would still stare us in the face. State measures to stop this deplorable social rot may be incompatible with the fullest possible satisfaction of consumers' choices as expressed in the " price system." In a question of the choice of ends, the economist *qua* economist is neutral ; but as a citizen he must choose. Phillip Wicksteed has well said:

> " When we consider that local distress is incidental to general progress we shall not indeed try to stay general progress in order to escape the local distress, but we shall try to mitigate the local distress by diverting to its relief some portion of the general access of wealth to which it is incidental. To mitigate the penalties of failure, without weakening the incitements to success, and to effect an insurance against disasters incident to advance without weakening the forces of advance themselves, is the problem

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[1] See Gunnar Myrdal, *Das politische Element in der nationalökonomischen Doktrinbildung* (translated into German from the Swedish by G. Mackenroth, 1932), p. 298. The concluding chapter, entitled " Die Nationalökonomie in der Politik," is an excellent summing-up of the problem.

which civilisation has not yet solved. No wonder, for it is only just beginning to understand what that problem is, and to recognise the 'deeply inherent limits' within which it must be solved."[1]

Local distress is often so overwhelming that a Government worthy of its trust should not hesitate to alleviate it, even at the cost of putting a brake on general progress.

TABLE I

Summary of the Return based on the Exchange of Unemployment Insurance Books in the South-Eastern Division,[2] *July* 1932

Area where books were exchanged.	No. of books exchanged up to July 23rd, 1932.	No. of books "foreign" to the S.E. Division.[3]	"Foreign" books as per cent. of total exchanged.
S.E. Division (114 Offices) ...	2,820,688	129,146	4·6
London	2,083,001	82,864	4·0
The Counties	737,687	46,282	6·3

TABLE II

Detailed Statistics for certain Exchange Offices. "Foreign" Books exchanged July 1932

Office where books were exchanged.	DIVISION OF ORIGIN.							
	South-West.	Midlands.	North-East.	North-West.	Scotland.	Wales.	N. Ireland.	Total.
Dover, Canterbury (coal-mining predominating) ...	228	515	989	238	183	720	3	2,876
Dagenham (motor vehicle, etc., predominating) ...	276	436	546	2,174	230	287	9	3,958

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[1] *The Commonsense of Political Economy*, edited by Professor Robbins (1933), vol. i, p. 357.

[2] This Table refers to "Foreign" books exchanged up to July 23rd.

[3] "Foreign" always means "foreign to the South-Eastern Division," i.e. books which were first issued in offices situated in other Divisions.

TABLE III

Numerical Distribution of Exchange Offices according to Absorption Rate

Per cent.	Under 1·0	1·0 to 1·9	2·0 to 2·9	3·0 to 3·9	4·0 to 4·9	5·0 to 5·9	6·0 to 6·9	7·0 to 7·9	8·0 to 8·9	9·0 to 9·9	10·0 to 10·9	11·0 to 11·9	12·0 to 12·9	13·0 to 13·9	15·0 to 15·9	19·0 to 19·9	28·0 to 28·9	
No. of Offices	0	13	15	21	16	12	5	6	4	5	5	5	1	3	1	1	1	Total 114

TABLE IV

Offices showing an Absorption Rate of 10 *per cent. and over*

Exchange Office.	1 Total number of books exchanged up to July 23rd, 1932, allowing for omission of "Kew" books.	2 Number of "Foreign" books exchanged up to July 23rd, 1932.	3 "Foreign" books as per cent. of Col. 1.
Dagenham ...	13,836	3,958	28·7
Dover ...	8,055	1,574	19·5
Slough ...	12,384	1,940	15·6
Welwyn ...	3,274	453	13·9
Hendon ...	13,912	1,819	13·1
Harrow ...	19,472	2,537	13·0
Canterbury ...	8,131	1,044	12·8
Staines ...	6,770	776	11·5
Southall ...	23,576	2,687	11·4
Tilbury ...	5,000	562	11·2
Caterham ...	1,840	206	11·2
Sutton ...	13,607	1,501	11·0
Hounslow ...	12,763	1,338	10·5
St. Albans ...	9,817	1,025	10·5
Leatherhead ...	3,196	326	10·2
Wolverton ...	5,170	526	10·2
Uxbridge ...	6,991	700	10·0

TABLE V

Offices showing an Absorption Rate under 2 per cent.

Exchange Office.	1 Total number of books exchanged up to July 23rd, 1932, allowing for omission of "Kew" books.	2 Number of "Foreign" books exchanged up to July 23rd, 1932.	3 "Foreign" books as per cent. of Col. 1.
Stepney ...	98,904	1,001	1·0
Maidstone ...	15,763	225	1·5
Tonbridge ...	4,662	65	1·5
Hackney ...	66,776	1,029	1·5
Stowmarket	2,865	47	1·7
Bermondsey ...	40,273	667	1·7
Sittingbourne	6,853	118	1·8
Shoreditch ...	95,068	1,776	1·9
Stratford ...	50,971	972	1·9
Sidcup ...	3,140	59	1·9
Borough ...	108,196	2,014	1·9
Colchester ...	7,768	149	1·9
Westerham ...	2,300	42	1·9

TABLE VI

"Foreign" Books exchanged in London and the Counties according to Division of Origin

Area where books were exchanged.	DIVISION OF ORIGIN							Final total of "Foreign" books exchanged.
	South-West.	Midlands.	North-East.	North-West.	Scotland.	Wales.	N. Ireland.	
London	15,442	13,037	20,071	12,980	8,220	15,916	577	86,243
Counties	9,374	7,711	11,491	7,457	2,681	8,173	176	47,063
S.E. Div.	24,816	20,748	31,562	20,437	10,901	24,089	753	133,306

TABLE VII

Numbers insured in Industry Groups in Great Britain and the South-Eastern Division, 1923 *and* 1932[1]

Industrial Group.[2]	GREAT BRITAIN		SOUTH-EASTERN DIVISION			
	No. insured in 1923	No. insured in 1932	No. insured in 1923	No. insured in 1932	% of G.B. in 1923	% of G.B. in 1932
Printing and Paper Trades	348,100	412,860	167,600	197,130	48·1	47·7
Miscellaneous Trades and Services ...	627,950	901,970	298,530	417,340	47·4	46·3
Miscellaneous Manufacturing Industries	128,690	153,810	54,350	68,270	42·1	44·3
Saw-milling, Furniture and Wood ...	189,580	225,600	75,740	94,070	39·8	41·6
Leather and Leather Goods	70,910	67,640	25,910	26,500	36·5	39·0
Distributive Trades	1,242,350	1,913,080	441,080	699,950	36·4	36·6
Clothing Trades ...	554,450	579,360	190,270	210,640	34·5	36·3
Gas, Water and Electricity	172,140	171,780	60,530	61,890	35·2	36·0
Building and Public Works	827,800	1,123,020	304,030	375,250	35·5	33·5
Food, Drink and Tobacco	493,460	523,900	167,370	172,190	34·0	32·9
Chemicals, etc. ...	216,360	215,460	63,080	70,370	29·1	32·7
Transport and Communication ...	774,810	858,270	254,400	277,270	32·8	32·3
Non-metalliferous Mining Products	42,310	49,710	13,210	15,340	31·2	30·9
National and Local Government ...	415,990	451,800	155,220	133,710	37·3	29·6
Construction and Repair of Motor Vehicles, Cycles and Aircraft ...	272,170	316,720	67,960	85,030	25·0	26·8
Glass Trades ...	44,280	45,660	9,100	11,110	20·5	24·3
Metal Trades and Manufacture[3] ...	550,640	633,230	111,230	151,160	20·4	23·9
Engineering ...	813,630	712,700	159,230	155,990	19·5	17·5

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[1] These figures are based on information supplied by the Statistics Branch of the Ministry of Labour.

[2] Except where otherwise stated these groups correspond to those adopted by the *Ministry of Labour Gazette*, e.g. November 1932, pp. 426-7.

[3] Excluding Pig-Iron Manufacture, Steel Melting and Iron Puddling, Tinplates and Iron and Steel Tubes. These are of no importance in the South-East: they are included among Other Industries.

TABLE VII—continued

Numbers insured in Industry Groups in Great Britain and the South-Eastern Division, 1923 *and* 1932—continued

Industrial Group.	GREAT BRITAIN		SOUTH-EASTERN DIVISION			
	No. insured in 1923	No. insured in 1932	No. insured in 1923	No. insured in 1932	% of G.B. in 1923	% of G.B. in 1932
Selected Textile Trades[1]	169,590	226,220	19,350	23,930	11·5	10·6
Brick and Tile, Pottery and Earthenware	132,850	161,310	11,390	16,080	8·6	10·0
Ship-building and repairing, and Fishing	271,910	202,390	26,980	19,610	9·9	9·7
Mining	1,369,620	1,147,010	7,160	14,720	0·5	1·3
Other Industries ...	1,520,410[2]	1,449,500[2]	89,910[3]	64,870[3]	6·3	5·0
	11,250,000[2]	12,543,000[2]	2,773,630	3,362,420	24·9	27·1

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[1] These comprise Silk and Artificial Silk, Hosiery and Miscellaneous Textiles. The other Textile trades are included among Other Industries.

[2] These totals include 83,000 persons in 1923 and 143,000 in 1932 insured in Commerce, Banking, Insurance, and Finance, who are not allocated to the Divisions. These figures have been deducted in order to arrive at the appropriate percentages in the last column.

[3] Other Industries in the South-East include persons employed in Commerce, Banking, Insurance and Finance, who are not insured under Special Schemes.

TABLE VIII

Generally expanding Industries and Services in which the Proportion of the British Insured Population located within London as well as the Counties increased between 1923 *and* 1932.

Industry	LONDON.				THE COUNTIES.				Absolute Expansion of Nos. insured in Gt. Britain and N. Ireland in 1923-32[1] Per cent.
	No. insured in 1923	No. insured in 1932	% of G.B. in 1923	% of G.B. in 1932	No. insured in 1923	No. insured in 1932	% of G.B. in 1923	% of G.B. in 1932	
Artificial Stone and Concrete ...	1,580	3,670	14·8	16·8	320	1,920	3·0	8·8	116·4
Distributive Trades	313,220	494,650	25·2	25·9	127,860	205,300	10·3	10·7	58·5
Paint, Varnish, Lead, etc. ...	5,440	8,100	39·9	40·4	250	980	1·0	4·9	53·1
Furniture Making, etc.	34,240	49,720	36·7	37·6	10,250	14,670	11·0	11·1	48·1
Stationery and Typing Requisites	2,640	3,670	55·1	55·9	250	480	5·2	7·3	42·4
Clay, Sand, Gravel, Chalk Pits...	350	1,330	2·8	8·1	2,780	4,400	22·1	26·8	37·0
Musical Instruments	15,090	19,650	76·6	77·4	780	1,770	4·0	7·0	34·2
Motor Vehicles, Cycles and Aircraft	32,230	43,430	16·7	17·4	21,570	29,100	11·0	11·7	33·0
Hosiery	2,680	4,430	3·0	3·9	870	2,050	0·9	1·8	29·2
Professional Services	31,270	41,060	29·3	30·4	10,650	14,240	10·0	10·7	28·8
Miscellaneous Metal	24,040	34,870	14·4	17·2	3,910	6,340	2·3	3·1	26·7
Glass Bottles	3,510	4,920	21·3	25·9	470	630	2·8	3·3	20·8
Hand Tools, Cutlery, Saws, etc.	1,010	1,560	3·3	4·6	100	360	0·4	1·1	16·5
Oil, Glue, Soap, etc.	17,780	26,160	22·6	32·5	4,080	4,470	5·1	5·6	9·2
Tobacco	13,560	16,900	31·5	37·7	250	480	0·6	1·1	7·9
Saw-milling, Machined Woodwork	8,740	9,570	15·4	16·5	7,610	8,440	13·5	14·6	7·5
Total	507,380	763,690	23·3	24·9	192,000	295,630	8·8	9·6	

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[1] See *Ministry of Labour Gazette*, November 1932, pp. 430-1.

TABLE IX

Generally expanding Industries in which the Proportion of the British Insured Population increased *in London and* decreased *in the Counties*, 1923-32

Industry	LONDON.				Absolute Expansion of Nos. insured in Gt. Britain & N. Ireland in 1923-32 Per cent.
	No. insured in 1923	No. insured in 1932	% of G.B. in 1923	% of G.B. in 1932	
Silk and Artificial Silk	620	1,550	1·6	2·2	93·8
Heating and Ventilating Apparatus	520	2,020	9·6	21·6	76·6
Electrical Engineering	6,870	14,820	11·0	15·8	57·4
Constructional Engineering ...	1,660	3,740	7·0	12·9	29·3
Oilcloth, Linoleum, etc.	1,390	1,880	11·3	13·9	16·1
Tailoring	43,210	54,920	23·8	26·5	15·4
Grain Milling	3,350	4,290	11·6	14·6	11·0
Drink Industries	20,540	24,190	20·5	22·7	10·3
Cement, Limekilns, etc.	710	1,130	4·3	6·9	6·4
Cocoa, Chocolate, Sugar, etc. ...	16,840	17,580	23·8	24·5	5·1
Tanning, Currying, Dressing ...	9,890	12,200	23·7	28·7	3·9
Total	105,600	138,320	18·2	20·1	

TABLE X

Generally expanding Industries and Services in which the Proportion of the British Insured Population increased *in the Counties and* decreased *in London,* 1923-32

Industry	THE COUNTIES.				Absolute Expansion of Nos. insured in Gt. Britain and N. Ireland in 1923-32 Per cent.
	No. insured in 1923	No. insured in 1932	% of G.B. in 1923	% of G.B. in 1932	
Electrical Wiring and Contracting	1,150	3,670	9·8	14·9	117·7
Tramway and Omnibus Services	6,690	14,940	6·1	8·4	71·2
Electrical Cables, Lamps, etc. ...	7,280	14,090	10·0	12·0	64·6
Local Government	30,620	44,980	12·7	13·5	51·4
Brick, Tile, Pipe Making ...	7,520	12,240	12·3	14·1	51·2
Hotel, Public House, etc., Service	26,410	40,040	10·5	10·6	50·4
Scientific and Photographic Instruments	910	2,420	5·0	9·6	49·4
Road Transport not separately specified	12,440	18,070	8·7	8·8	44·1
Industries and Services not separately specified	10,170	17,900	9·3	12·1	42·4
Brushes and Brooms	1,820	2,510	20·4	21·3	38·1
Printing, Publishing, etc. ...	19,120	25,310	8·3	9·0	28·0
Building	108,400	134,260	15·4	16·0	25·8
Food Industries not separately specified	11,410	16,060	11·7	13·7	25·7
Toys, Games and Sports Requisites	830	980	6·8	7·1	17·3
Rubber	1,110	1,270	1·9	2·0	15·3
Stove, Grate, Pipe, etc.	3,470	4,060	4·1	4·4	15·2
Cardboard Boxes, etc.	4,480	5,870	8·2	9·7	12·8
Paper and Paper Board	13,270	16,740	23·7	28·5	10·8
Gas, Water and Electricity ...	17,710	18,940	10·3	11·0	5·6
Hats and Caps	11,230	13,300	32·5	37·4	5·2
Railway Carriages, etc.	3,760	4,170	7·3	8·5	0·5
Total	299,800	411,820	11·5	12·5	

TABLE XI

Industries, substantially localised in London, whose importance relatively to the country as a whole declined in London but increased in the Counties, 1923-32

Industry.	LONDON.				THE COUNTIES.			
	No. insured in 1923	No. insured in 1932	% of G.B. in 1923	% of G.B. in 1932	No. insured in 1923	No. insured in 1932	% of G.B. in 1923	% of G.B. in 1932
Scientific and Photographic Instruments	10,310	13,910	58·0	54·9	910	2,420	5·0	9·6
Electrical Cables, etc.	38,740	57,020	53·2	48·6	7,280	14,090	10·0	12·0
Printing, Publishing, etc. ...	98,440	115,330	43·3	41·0	19,120	25,310	8·3	9·0
Cardboard Boxes, etc.	22,400	22,310	40·9	37·0	4,480	5,870	8·2	9·7
Industries, and Services not separately specified	41,730	48,930	39·8	33·0	10,170	17,900	9·3	12·1
Food Industries not separately specified	31,810	32,150	32·7	27·3	11,410	16,060	11·7	13·7
Brushes and Brooms	2,700	3,300	30·2	28·1	1,820	2,510	20·4	21·3
Electrical Wiring and Contracting	3,070	3,590	26·0	14·6	1,150	3,670	9·8	14·9
Total ...	249,200	295,540	41·8	37·7	56,340	87,830	9·5	11·2

Appendix

The Boundaries of the Ministry of Labour Divisions

South-East.—Greater London and the Counties of Bedford, Buckingham, Cambridge, Essex, Hertford, Kent, Middlesex, Norfolk, Suffolk, Surrey and Sussex.

South-West.—Counties of Berkshire, Cornwall, Devon, Dorset, Gloucester, Hampshire, Oxford, Somerset and Wiltshire.

Midlands.—Counties of Derby (except Glossop and New Mills Districts), Hereford, Huntingdon, Leicester, Northampton, Nottingham, Rutland, Salop, Stafford, Warwick, Worcester, the Soke of Peterborough and the Stamford District of Lincolnshire.

North-East.—Counties of Durham, Lincoln (except Stamford District), Northumberland (except Berwick District) and Yorkshire.

North-West.—Counties of Cheshire, Cumberland, Lancashire, Westmorland, New Mills and Glossop Districts of Derbyshire.

Scotland.—Scotland and Berwick District.

Wales.—Wales and Monmouthshire.

Notes

A Note on Banking Policy and the Income-Velocity of Circulation of Money

By J. C. Gilbert

It is the purpose of this note to consider the effects of an increase in the amount of saving made by the public through the mediation of the banking system. It is generally agreed that this change, which is a decrease in the income-velocity of circulation of money, will upset equilibrium. The quantitative importance of such a change as a cause of disequilibrium has, however, often been exaggerated due to the neglect of the distinction between autonomous and induced changes. An autonomous change may be defined as a change in the saving habits of the public which is not brought about by a condition of disequilibrium. An induced change may be defined as one which is itself the effect of disequilibrium. To a certain extent it is merely the monetary aspect of the conditions of disequilibrium, but it may itself become an aggravating cause. The more important quantitative changes in income-velocity take place during the downward swings of the trade cycle and are to be considered as induced changes. These changes would, of course, be avoided by the elimination of the inflationary boom. This note deals only with the effects of an autonomous change.

The effects of an increase in the amount of saving which directly causes a reduction in income-velocity depend upon the policy of the banking system. The results of such a change can be analysed on the basis of three different assumptions regarding the reaction of the banking system. The banking system may take no action ; it may maintain the quantity of money multiplied by its income-velocity of circulation constant ; it may maintain the quantity of money constant.

1. If the banking system takes no action it will, in effect, be maintaining the money rate of interest above the equilibrium rate.[1] This will cause a reduction in the quantity of money. The decrease in income-velocity will mean a reduction in the amount of money spent on consumers' goods and a fall in the prices of these goods. If stocks are not increased the public will consume just as much as before with a lower money expenditure because prices will have fallen proportionately. Voluntary saving will thus be in excess of investment and the new savings

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[1] It is assumed that the increased saving in the form of holding bank deposits is a net increase so that the equilibrium rate of interest falls.

will not have led to an increase in the community's capital equipment. The fall in the prices of consumers' goods will mean that the money receipts of the producers in the final stages of production will fall. These producers will employ less labour and will purchase less of the products of the preceding stage of production and in this way they will reduce their money costs of production. The producers in the other stages of production will take similar action as the prices of the products of the various stages of production fall. In this way the total quantity of money will be reduced, which was to be expected as the inaction of the banking system involved the maintenance of the money rate of interest above the equilibrium rate.

This process of falling prices and a reduction in the quantity of money will have a definite limit. As Mr. Keynes has pointed out in the banana parable in his *Treatise on Money*, the reduction in the producers' money costs will not directly equate their money costs and money receipts.[1] A reduction in money costs will lead to a reduction in the community's money income and tend to cause a further reduction in money receipts. This process will not, however, continue indefinitely, as the reduction in the money costs of production is achieved partly by a decrease in the amount of the factors of production employed. As all prices will not fall at the same rate, the prices of certain factors of production, particularly the prices of labour, will be above their marginal productivities so that a certain amount of such factors will be thrown out of employment. This reduction in the amount of factors of production employed will result in a diminution of the national income and in the rate of saving. It is clear that prices will cease to fall due to the decrease in income-velocity and the consequential decrease in the quantity of money, when the reduction in the national income reduces voluntary saving sufficiently to raise the equilibrium rate of interest to the money rate. This position is, however, unstable as there are factors of production unemployed. It is outside the scope of this note to analyse this problem further, but it appears that no equilibrium in which all factors of production are employed is possible.

2.[2] The banking system may take positive action when the prices of consumers' goods tend to fall due to a decrease in the income-velocity of circulation. The banks may increase the quantity of money and prevent the fall in the prices of consumers' goods. This is the banking policy advocated by Mr. Robertson in his *Banking Policy and the Price Level.*[3] [4] It appears doubtful whether this policy is appropriate. The new supplies of money are injected into the economic system via the producers by means of lowering the money rate of interest below the new and lower equilibrium rate. When the quantity of money has been sufficiently increased to compensate for the decrease in income-velocity of circulation, the money rate of interest must be raised to the new equilibrium rate. While the money rate has been maintained below the equilibrium rate, investment has not increased in excess of voluntary saving. There appears, however, to be an objection to Mr. Robertson's policy in that the increased investment is undertaken while the money rate of interest is below the equilibrium rate. During the period of expansion of the quantity of money, capital will be misdirected. Entrepreneurs will attempt to establish a structure of production based on a rate of interest which is lower than the equilibrium rate. It might, at first sight, be thought that this is not a valid objection as investment is not in excess of saving and however low the money rate of interest may be, increments of capital will be employed where the marginal productivity of capital is highest. On these lines it might be argued that the last increment of the new savings employed in capitalistic production would have a productivity equal to the equilibrium rate and quite unrelated to the existing money rate. This argument is untenable as the money rate of interest will determine the structure of production which entrepreneurs will attempt to establish. When the money rate is raised again it will be discovered that capital equipment has been provided which will only fit into a structure of production based on a lower rate of interest.

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[1] J. M. Keynes, *A Treatise on Money*, Vol. I, p. 177.

[2] It should be noted that in case 1 factor prices were not assumed to be absolutely flexible. In cases 2 and 3 absolute flexibility of factor prices has been assumed in order to make possible some general conclusion as to what constitutes "neutral money."

[3] D. H. Robertson, *Banking Policy and the Price Level*, p. 53.

[4] Dr. Hayek seems to take a similar view. Cf. F. A. Hayek, *Prices and Production*, p. 107.

3. The banking system may, however, take a different form of positive action. Instead of maintaining the quantity of money multiplied by its income-velocity of circulation constant, it may maintain the quantity of money constant. In this case the action which the banking system will have to take will be to lower the money rate of interest to the new and lower equilibrium rate. Such a policy will not prevent a fall in the prices of consumers' goods, but, if factor prices are not rigid, investment will be increased to equal the increased voluntary saving. The quantity of money will remain constant but the producers in the earlier stages of production will borrow more from the banks and the producers in the later stages will borrow less. There will be a transfer of factors of production from the later stages of production to the earlier stages. With the decline in income-velocity there will be a decline in the money receipts of the final stage of production. There will be an equivalent reduction in the money costs of this stage and in the money income of the factors of production. The prices of the factors of production in the new equilibrium will be lower because of the decline in income-velocity and the increase in the supply of capital. The prices of consumers' goods will be lower due to two factors. Firstly, there is the reduction in the income-velocity of circulation of money. Secondly, there is the increase in the output of consumers' goods due to the adoption of more capitalistic methods of production, which will also cause a fall in their prices.

The decline in the income-velocity of circulation of money, which necessitated a fall in the prices of the factors of production and in the prices of consumers' goods, was a direct effect of the public's increased saving through the mediation of the banking system. The increase in saving took the form of an increased demand to hold bank deposits, that is, a reduction in their income-velocity of circulation. With the lengthening of the period of production, which is made possible by the increased saving, there may be a further decline in income-velocity, which will necessitate a further fall in factor prices and in the prices of consumers' goods. Such a further fall in income-velocity is not necessary as there is no direct connection between the length of the period of production and the income-velocity of circulation of money.[1] If this possible decline in income-velocity actually takes place, a further adjustment is required. This adjustment involves a further fall in the prices of the factors of production and in the prices of consumers' goods, but not a further lengthening of the period of production. In this case we can assume that saving is not increased when the velocity of circulation declines.

This analysis of the effects of an increase in the amount of saving made by the public through the mediation of the banking system is obviously very incomplete. Nevertheless, it does seem to indicate that a neutral money policy implies the maintenance of the quantity of money constant and not the quantity of money multiplied by its income-velocity of circulation.

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[1] F. A. Hayek, *Prices and Production*, pp. 57-61.

Book Reviews

Population Trends in the United States. By WARREN S. THOMPSON and P. K. WHELPTON. McGraw-Hill Book Company. 24s. net.

This book, which constitutes the first volume of the series of monographs on Recent Social Trends in the United States, is a most welcome contribution to the scanty American demographic literature. The authors begin by showing that the population growth " on the whole was remarkably uniform for the two centuries 1660 to 1860," progressing at about 35 per cent. in a decade. After 1860 the decennial rate of growth slowed up, being about 25 per cent. from 1860 to 1890, about 20 per cent. from 1890 to 1910, and slightly in excess of 15 per cent. from 1910 to 1930. They estimate that the population which was 122,775,000 in 1930 will be between 132,000,000 and 135,000,000 in 1940, and between 199,000,000 and 202,000,000 in 1980, and they " believe the actual population will be much closer to the lower limit than to the upper." This belief is justified. But it is quite possible that the population in 1940 will not even reach the lower limit, since according to the computations of the authors the population increased in 1931 and 1932 by not more than 872,000 and 828,000 respectively.

Thompson and Whelpton take a rather pessimistic view of what can be accomplished in extending life. Judging from the development of mortality in 1921-1930, when the expectation of life increased from 58·0 to 59·7 years only, they think it possible that it will never rise above 62·5 years.

The authors have an exceptional command of statistical methods and display great courage and imagination, two qualities essential in dealing with the population trends of a country with inadequate vital statistics in the past and seriously incomplete birth registration up to now. It was perhaps unavoidable that the makeshifts they had to use sometimes led them astray. A striking example is their analysis of the differential fertility between urban and rural dwellers. They give two tables, the one showing for the whole United States the ratio of children under five to women of 20 to 44 years in urban and rural districts, the other showing the ratio of births to women of 15 to 44 years for " United States, Urban (Estimated) " and " United States, Rural (Estimated)," those estimates being based on data from selected states. It appears from both tables that fertility in the rural districts in 1929 was about 70 per cent. higher than in the urban districts. If the authors had only checked their computations by relating the rural and urban births of 1929 to the women 15 to 44 in the rural and urban districts of the United States registration area, they would have found that the ratio of births to 1,000 women in the child-bearing period was about 87 in the rural and about 75 in the urban districts. It may, of course, well be that the difference between rural and urban fertility was actually still smaller or else larger than indicated by the general fertility rate, because that rate does not take account of the age composition between 15 and 44, and above all because the deficiency of birth registration may be smaller or larger in the rural than in the urban districts. The authors themselves believe that for the whole United States the omissions amount to 6·9 per cent. for the whites and to 19 per cent. for the negroes. But these omissions vary enormously from district to district.

This book shows once more that what is urgently needed is a comprehensive appraisal of the birth records in the United States. Once such an appraisal is made, quite a few conclusions of the authors may prove to be erroneous. But at present their book doubtless is the best available presentation of the population trends in the United States.

R. R. KUCZYNSKI.

The Modern Corporation and Private Property. By A. A. BERLE and G. C. MEANS. Macmillan. 396 pp. 20s.

Good wine needs no bush. Those who have followed the articles of Messrs. Berle and Means in the American legal and economic journals will know that here they have a first-class study of the American corporation. Students of its opposite number in England—the limited company—will look with greatest envy on this fine outcome of team research. There is nothing like it for England, either on the economic, the sociological or the legal side, although Professor Tawney has outlined much for the former and Mr. H. B. Samuel has contributed heavily to the latter. We do not yet seem to have realised that though the corporate system is very new it has brought all things under it, turned the traditional defence of private property topsy-turvy and itself become a major social institution.

The details of scale given here are staggering: the American Telephone Company alone "controls more wealth than is contained within the borders of twenty-one states in the country." The concentration of power is still more staggering: outside banking, insurance and investment trusts, the two hundred largest companies control half the corporate wealth of the United States, 40 per cent. of the business wealth and 22 per cent. of the total national wealth. Much more than half of industry is dominated by these gigantic concerns. Their ubiquity is illustrated in a passage which modern students might well set against Adam Smith's purple patch on the division of labour. They have some 2,000 directors, of whom only a few hundred are active. A few hundred men, out of a population of 125,000,000, control and direct half of American industry—a result more consonant with Marx than with the American Constitution.

Nor can it be alleged that these men are controlled by the shareholders.

The authors give many tables to illustrate the enormous dispersion of share ownership: only six concerns show less than 1,000 shareholders, and more than half the assets belonged to companies with 50,000 shareholders or more. They believe the dispersion to be increasing, even outside the holdings by customers and employees. Down to 1921 they find a shift, in ownership, from persons of large means to persons of small means, a result probably of income-tax law. The trend to the much trumpeted "democratisation" of industry has stopped. Whether it will continue will depend on the treatment meted out to small holders, and here the authors (and facts) are depressing. They think that, outside the corporate system, the only alternatives are foreign investment or no saving at all. They had not before them the more recent official inquiries into American finance which enable us to pick the most probable result and to conclude that there are other things in the economic system besides inflation which may check abstinence.

On this point of control much of interest and instruction is presented to us. Total and true majority controls are essentially irrelevant in face of the facts. "Pyramiding" through holding a majority in one concern which has a majority in another quite obviously follows the geometric rule of growth. The Van Sweringen brothers by an investment of twenty million dollars control two thousand millions. If to this, or in lieu, we add non-voting shares, the vista will appeal to the higher mathematician! Dillon Read, by a two-and-a-quarter-million holding, control one hundred and thirty millions. Fortunately, following a theory of the "free market," the New York Stock Exchanges now refuse to list non-voting ordinary shares but admit non-voting preference ones only. The issue of shares with specially heavy voting rights is another example. Doherty's, with a one-million holding, so controlled a thousand millions. Such devices give full legal control.

Minorities, without full legal control, can also if they attract enough "free" votes reach the same objective. This depends essentially on the goodwill of the actual management, who in fact control the proxy rubber-stamping. The difficulties which even Mr. Rockefeller experienced in the Indiana Standard Oil Trust illustrate this. The English law of libel precludes mention of an analogue here.

Following this is clearly the fifth type of legal control—control by the directors themselves, a self-perpetuating oligarchy. This will happen in the common case where even the largest minority holder is still too minute to form a nucleus, as above. The directors necessarily pick the proxy committee, which is under their control. If serious mismanagement occurs, several large minority interests may, at their own expense, find each other out and, again at their own expense, attempt to widen the circle of revolt—illustrated by Childs', who, though the Lyons' of America, tried to make their customers vegetarians.

The authors conclude that in this group of 200 largest companies, controlling half of American industry, some 58 per cent. (by assets) were under management control, 22 per cent. under legal devices as above, 14 per cent. under minority control, 2 per cent. under true majority control and 4 per cent. under total private ownership. A table of twenty pages supplies the proof for this conclusion of "ownership without appreciable control and control without appreciable ownership."

This raises the fundamental question : are we justified in assuming that those in control will run the business in the interests of the owners ? The authors realise that others besides owners, say employees and customers, have an equitable claim to consideration when they concentrate on the main question. And they pose the question : if we take the traditional individualist assumption, that the most effective incentive is personal profit, rather than prestige, power or professional zeal, where would this lead ? Obviously, " the owners most emphatically will not be served by a profit-seeking control." For what they may lose *qua* shareholders they may more than gain *qua* individuals. Examples follow : sale to company of personal property ; the long railway wreckings ; switching profits from company A, where the control's private interests are small, to company B, where they are big ; false information for market manipulation ; and so on. Even if the incentive is power, it may be bought at the expense of the owners. If it is professional zeal and pride, then for the benefit of employees or customers the control might sacrifice the owners.

While a general agreement must be given that all these defects (from owners' standpoint) are everywhere potential and often actual, one must enter the caveat that they do not logically follow from the demonstrated facts. We must know more. They do not follow from the fact that the controlling group's holding is proportionately minute when measured against the company's capital. They would follow if the group's holding were a small part of the group's private wealth. Who would wreck a company or switch profits from a company where, though one's holding was a mere 1 per cent., it was still 90 per cent. of one's private fortune ? If the holding was small absolutely (as I think can often be demonstrated for English companies), then the inference that it was small proportionately both to the company's capital and to the private fortune would be justified, and the author's conclusions would then follow logically. But most readers may agree that the weakness in the argument is formal rather than substantial in too many cases for it to be a comfort. There is real danger here—and with it, difficulties for theorists of individualism.

That it is real comes out in a long and most interesting legal account of the regrouping of rights within the company. Point by point, the main thesis is driven home that under American law the control has been permitted almost unexplored permission " to deprive the grantors [shareholders] at will of the beneficial interest in the capital thus contributed." If the danger were not real, if control and owners do not clash in interest, why this steady drift of legislation ? All the safeguards of the old "chartering" days have been swept away, and, as largely in English articles of association, "the general incorporation law to-day permits the originating group to write their own contract on the very broadest of terms . . . the other party not only does not participate in the negotiations but in practice never even sees the document." The competition of the separate states for incorporating business is only partly responsible for this. A new thing has arisen in law, the control's "power of confiscation of a part of the profit stream and even of the underlying corporate assets by means of purely private processes, without any test of public welfare or necessity." If we are to avoid a strike of capital, the doctrine of trusteeship must be extended : the use of the power must be "subject to equitable limitation." But with the growth of absolute powers, the day when capitalists will strike comes nearer, if indeed in many fields of investment it has not come.

The authors, despairing of the necessary fundamental legal reform, turn more hopefully to the Stock Exchanges. These require a "free market" of buyers and sellers whose freedom depends not on prices "slaughtered beyond reason" (like a starving worker who must take anything) but on "respectable open market appraisal." This involves information and unless the companies supply the required and detailed information their shares will not be quoted. Although some 40 per cent. of available profits were ploughed back by the 200 companies, yet half of their growth has come from public issues. Here lies the check on too nefarious an activity. But the writers realise that this is often locking the stable door when the horse has gone.

Finally, in a brief but suggestive section, they discuss the impact of the corporate system on some fundamental concepts. Economists, concerned not with the rights of property but "with the production of wealth and distribution of income," have claimed that the individual, seeking profit and income, can do so only by rendering service ; that this profit is an incentive to take risks and to become efficient. But under the corporate system, who has the right to those profits, if any, "more than sufficient to keep the security holders satisfied"—a standard precise enough in practice ? They are not wanted for risk-bearing and shareholders cannot claim them for their efficiency. If they all go to shareholders, what inducement is there to the control ? What then of the "rights of private property" ? But, historically, power in society has been lodged in different hands, e.g. the Catholic Church and autocratic political bodies. While "absolute power is useful in building the organisation," slow but sure social pressure applies tests of public benefit to the exercise of that power. The authors, with many others, hope for a time when "the control of the great corporations should develop into a purely neutral technocracy, balancing a variety of claims by various groups in the community and assigning to each a portion of the income stream on the basis of public policy rather than private cupidity." But, perhaps inevitably along this line of approach, they here list no examples.

H. A. SHANNON.

Unemployment in Germany since the War. By KENNETH I. WIGGS. P. S. King, 1933. 216 pp. 10s. 6d.

However prone some economists may be to deplore the introduction of unemployment insurance (and Dr. Wiggs tends to associate himself with them), they must at least admit that it has made it possible to analyse with tolerable accuracy the quantitative aspects of unemployment. Inductive inquiry seems to depend not a little on the activities of institutions like taxation authorities, trade unions and social insurance agencies which are frowned upon by the purist as grit in the economic machine.

The present study is based chiefly on unemployment insurance figures. The author begins with a useful review of the available indices ; and, though each of them is in some degree inadequate, he finds comfort in the fact that they act as a check on one another. Pre-war unemployment in Germany at the worst peaks reached 1,500,000, two-thirds of which was accounted for by seasonal factors. Since the war fluctuations have been much more violent. The chronic scarcity of capital and the high rate of interest are given due prominence. The increase of " basic unemployment " in the years 1925-9 is attributed to an excessive wage level rather than to " rationalisation." Finally, it is shown that surplus labour in Germany is much more evenly distributed among regions and occupations than it is in Great Britain. There are appendices on the " Question of Population " and " The Influence of Price-fixing."

This book is a welcome addition to the literature on the quantitative side of the unemployment problem. It enables the reader to see clearly the main points of similarity and contrast between German and British experience. One cannot help feeling, however, that the conclusion regarding the causation of " basic unemployment " in the period 1925-9 is much too simple to be convincing ; and the argument that leads up to it is not altogether free from ambiguity. There are at least two possible issues. (*a*) Technical progress (in the strict sense) did take place, but rigidity was too considerable and the period too short to permit the necessary adjustments : hence unemployment. (*b*) There was no technical progress : the substitution of capital for labour was induced by an excessive wage level : hence unemployment. According to Dr. Wiggs's definition, " rationalisation " can take place either " without a change in the prices of the factors " or " *because* of such a change." Thus what he actually does in his analysis is to consider the relative importance of two different types of " rationalisation." His conclusion, however, is that " rationalisation " is innocent and " high wages " guilty. The obscurity could have been avoided by more precise definitions. As to the actual thesis, it is probable that there was more technical progress in Germany in this period than the author is prepared to admit.

Finally, it must be added that this study does not take into sufficient account the factors that complicated Germany's " cyclical " experience in the years 1924-9. The indices sometimes point in opposite directions and they do not lend themselves easily as a basis for a coherent interpretation.

BRINLEY THOMAS.

Elementary Statistical Methods. By E. C. Rhodes. Routledge. 246 pp. 7s. 6d. net.

This is the first of a series of Studies in Statistics and Scientific Method issuing from the London School of Economics under the editorship of Professors A. L. Bowley and A. Wolf—in itself a sufficient guarantee of its standard. It is intended for persons who are not mathematicians and consequently its scope is limited : it contains no discussion of probability and sampling, correlation, and other fundamental branches of the subject which demand the use of advanced mathematical analysis. But within the limits selected it provides an admirably clear introduction to the first principles of statistical method. Even were the author unknown it would be evident from his manner of presentation that he must have spent laborious days in devising ways of making his subject plain to generations of students lacking statistical experience, and one would venture to guess that he is more than ordinarily successful as a teacher.

Stress is rightly laid at the outset on the necessity for precise definition and for careful inquiry into the exact sources of the raw material and the methods used in assembling the statistics in any investigation. Attention is directed also to the caution that should be exercised in the interpretation of results which depend upon a variety of factors, measurable and unmeasurable, and the influence which the number of figures used in the actual calculation may have upon the final answer to a question—matters which frequently lead even the more intelligent astray.

The writer goes on to define certain averages and measures of dispersion and to show how they may be determined. There is a brief but useful introduction to index numbers and the book ends with two chapters on the graphical representation and analysis of time series, the last being one of the best in the book. The examples, drawn mainly from the field of economics, are excellent, but none are provided for the student to work out for himself. That is a defect which should certainly be remedied in a later edition. The majority of students are quite well able to follow an elaborate calculation done for them, yet, without practice, they are helpless if asked to go and do likewise.

Many volumes—far too many—have recently been written on the alphabet of statistics, but this one can be welcomed for its austerity and thoroughness. If Dr. Rhodes could be persuaded to leave the crowded furrows and write another volume expounding with the same clarity the more recent developments in statistical method, he would be doing a service to a large circle of research workers who ought to use these methods but who take fright at the mathematics they involve.

D. Caradog Jones.

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School Notes

GOVERNORS

Professor Henry Clay, M.A., M.Com., D.Sc.; the Rt. Hon. Sir Halford J. Mackinder, M.A., the School's second Director, 1903-8; and Mr. Eric Miller, a member of the Management Committee of the Department of Business Administration, have been co-opted members of the Court of Governors and Council of Management.

Dr. W. H. Coates has been invited to serve upon the Emergency Committee of the Court.

STAFF

The following members of the junior academic staff have been recognised as teachers of the University:

Mr. D. W. Brogan, M.A., in Political Science;
Mr. E. F. M. Durbin, B.A., in Economics;
Mr. Denys W. Harding, M.A., in Psychology (probationary);
Mr. H. A. Shannon, B.Sc.(Econ.), B.Com.Sc., in History; and
Mr. R. S. Sayers, M.A., in Economics.

THE LONDON SCHOOL OF ECONOMICS REGISTER

The London School of Economics Register, 1895-1932, has now been published and is on sale at the price of 3s. 6d. (postage 6d.). The contents include an Introduction by the Director, statistical tables, a list of teachers of the School since 1895 and various appendices, in addition to the Register proper, which gives biographical notes of students who graduated or obtained diplomas or certificates in the thirty years ended July, 1932. The publication of an annual supplement is proposed.

The first Calendar of the School (for the session 1895-6) has been reprinted as being a document of some historical interest, and is also on sale, price 6d., or 3d. to purchasers of the Register.

Capital, Time, and the Interest Rate

By Frank H. Knight

(*Professor of Economics in the University of Chicago*)

1. In view of the history of human thought and the character of its contemporaneous workings, it is more than possible to doubt whether there is any general connection between men's reasoning and the conclusions which purport to rest upon it. Indeed, this is not much less true in the history of the natural sciences prior to the age of experiment, than it is in other branches of so-called thinking (with the exception of religion). There is a similar difficulty in tracing a definite relation between the professed conclusions of thinking and actual behaviour, particularly where social relations are involved. However, it seems unavoidable for one who makes his living by alleged intellectual activity to assume that there is some connection between reasoning and conclusions, and to pretend that there is some dependence of better action upon better beliefs.

If there is any connection between reasoning and conclusions, and *if* " correct " economic theory has any superiority of any kind over that which is incorrect, there can be no greater " service " to economic thought than that of striking any blow tending to free it from the incubus of the generally accepted theory of capital in most of its aspects. Reference is made to the " wage fund " theory of the early classical writers as modified by Jevons, Böhm-Bawerk, and Wicksell, and disseminated chiefly by Böhm-Bawerk. In these notes, the formality of even summarising the history of this doctrine will be completely subordinated to the task of making the simplest possible statement of the essentials of a sound theory. The contrast between these essentials and the Böhm-Bawerk position can best be covered by incidental comments in the course of constructive argument. It need only be added here that the doctrines to be eliminated include all notions of any definite relation between quantity of capital and the " length of the production process," or " time " in any form except the basic one of a dimension in summating any process, and include also the notion that the production process, under the ordinary conditions of capitalistic industry, has any determinate time length.

2. Three empirical facts form the basis of a sound theory of capital. The first is the simple " technological " fact that it is possible to increase the volume (time rate) of production after any interval by the use during that interval of a part of existing productive resources—in large part the *same* resources previously and subsequently used, for producing " current consumption income "—to produce, *instead* of current consumption income, instruments or agencies of various sorts, tangible and intangible, which when produced become " productive " of *additional* current income. This activity or process we call *investment*. A second basic fact is that the process of investment is actually, normally, carried on in large volume, on a competitive basis, in economic societies of the type to which ordinary price theory relates. That it continues to be carried on means of course that the possibility is not exhausted by taking advantage of it; in fact, the quality of investment opportunity is not seriously affected—especially not adversely—by the investment actually carried on in an ordinary accounting period or interval, say, of the order of a year, for which calculations are made. The third essential fact is an " institutional " one. There exists a general market in which productive resources or income sources, and also pecuniary incomes as such, are freely bought and sold.

Under these conditions the phenomenon of capital accounting inevitably arises, giving expression and precise form to the economic rationale of all activities which involve saleable productive resources. (It is to be noted that in the typical competitive economic society not all productive resources are saleable; in fact, a minor fraction are so, these being called " property," in contrast with " labour," which is " free.") The operation of capital accounting converts every saleable productive resource into a pure quantity of " capital." The theory of capital accounting under the conditions named is virtually the sum and substance of the theory of " interest " as a *rate* of return on *capital.*

3. There is no necessary error involved in developing the theory of capital and interest in the general form employed by Jevons, and his followers. This form centres in the use of an isosceles triangle to diagram an especially simple case—the case in which a productive instrument or income source is

created by "expenditure" at a uniform rate for a given period, and then used up at a uniform rate in an exactly equal period. The precise meaning of an income source, of the rate and period of building up and of tearing down, the nature of the starting point, the expenditure, the return, and the end-point, are questions which can be fully discussed only by developing the theory of the process as a whole. The point here is simply that the history of every new capital item involves an ascending phase—a construction period of some shape and length—followed by a phase of utilisation. We must notice at once, however, that the utilisation of an item may or may not represent a "descending" phase. That is, the "use" of the productive agent (income source) may or may not involve "using up," including loss of sale value from any cause. If it does not, the second phase of the diagram is a horizontal straight line parallel to the base (which is a time axis) and extending from the maximum point of the ascending phase onward to infinity. Where using up, wearing out, depletion, or decline in rentability from any cause is involved, it may represent a virtually infinite variety of changes in the income source itself or outside of it, and the entire curve of capital-quantity (value) for a given identical agency may have an infinite variety of shapes, even rising and falling, and any horizontal length, before falling to "zero" (see below). Moreover, all using up is a technical detail; all capital is normally conceptually, perpetual, as will be shown later.

It is to be emphasised that there must be a utilisation part of the diagram, either finite or infinite; its base cannot be zero. A productive instrument means any "thing" which has saleable value, and any such item must yield some return over some period of time. It is unreal to think of any value experience as instantaneous or lacking a time dimension. Furthermore, the utilisation of a thing created by economic production must be the result of planned activity, and it is clearly impossible to value by anticipation an instantaneous experience not thought of as leaving a more or less enduring change of state, either in the subject or in his environment. This is true even if we assume that it is possible to imagine an instantaneous experience as such, which it rather clearly is not. The only primary value magnitude possible for economic thought is *consumptive income*, a pure service, a pure intangible, a flow, at some intensity, for some interval. Any concrete thing which has value (capital or wealth) is valued merely as a source of such a future consumption income. This proposition, if not immediately self-evident, must become so in the further course of the argument. The relation between quantity of wealth and the different variables or dimensions involved in such an income-segment is one view of the problem of interest.

4. The essentials of the theory of capital and interest may be stated in four or five main propositions. First: The amount of capital " in " any item, i.e. the theoretical sale value of any productive instrument or property item at any moment, is determined mathematically as a " present worth " by discounting its future yield (assumed to be known) back through time to the moment of valuation, at a uniform rate.[1] This applies, with necessary but obvious qualifications, to any moment for which the value may be struck; but it is convenient to consider the moment at which the capital first reaches its maximum value, which is the end of its " construction period." Second: The amount of capital represented by any item is *also* determined mathematically (under economic conditions, meaning correct foresight and planning) by its " construction cost." But—and this is especially important—the construction cost always and necessarily includes two elements. The first is the arithmetical sum of payments to the previously existing productive agencies which are employed in creating the new item in question. These payments are of the nature of income to the owners of the agencies, and may be made at any interval, or from moment to moment as the services in construction are rendered. The second element is an accumulated " carrying charge " on each increment of such outlays from the moment when each is incurred to the moment of valuation of the instrument. Third: Because every increment of cost incurred must yield a return at the same rate over the whole period for which that increment is invested, the carrying charge is accumulated at the same rate as is used in discounting any increment of income to arrive at its present worth. The fourth statement sums up the first three: The construction cost is equal to the present value

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[1] Anticipated changes in the " going " rate introduce complications which will not be considered here. They could be dealt with by finding an equivalent uniform rate through all future time. Under regularly fluctuating physical conditions such as the seasons, the discounted value of an instrument may fluctuate like that of a bond in connection with accumulation and disbursement of the interest. But such fluctuations cannot contravene the principle that no item of saleable property will be kept in possession unless it is yielding income in some form, at the same rate as any other property in the market for which it might be exchanged. But such refinements are outside the scope of this survey of principles.

of the anticipated yield, *when the rate at which carrying cost of direct outlay items is accumulated is the same as the rate at which future direct yield is discounted.* Fifth: Any " investment," i.e. any creation of an income-yielding item, is made under the condition that the *rate* in the foregoing statements is the maximum possible in the technical circumstances—including present and anticipated prices of products—of the economic situation in which it is made. This economic situation or " economic society," is to be understood as an " area " within which there is both (*a*) freedom of choice among investment opportunities and (*b*) a free market for the purchase and sale of capital items, for " cash "—meaning really the exchange of income-segments of varying duration and volume against each other.

5. At this point a few general " remarks " may possibly forestall certain confusions. (1) The yield of a capital item here means the imputed yield, which is the sale value of some service rendered, valued at the instant at which it is rendered —(assumed to be in the future at the moment of valuation of the instrument) less (*a*) payments to other agents co-operating with the instrument in question, and (*b*) payments covering all upkeep cost for the instrument but excluding provision for its replacement at the end of its service life if this is limited. (2) The service rendered by a capital item may be of widely varying sorts, such as (*a*) a contribution to the increasing value of another item under construction; (*b*) a current monetary return; (*c*) a current " satisfaction " of any sort including mere pride or pleasure of ownership to the owner of the item; or (*d*) an increase in the value of the item itself. (Such an increase may result from any of a multitude of causes.) This last item (*d*) applies only at moments before the maximum point in the growth of the item; but it is essential to understand that any increase in value is a value-income, equivalent to, because exchangeable for, any other income of equal value, irrespective of the current application to the item of any productive services other than merely holding it for the increase, i.e. *not* selling it. The relations between consumption income and increase in capital will receive more detailed consideration presently.

(3) On the cost side (ascending phase), the direct outlays incurred will practically always include a proportion, which may be small or large, of payments to pre-existing " capital items." These, of course, may take the form of " rent " in the

ordinary business sense, a payment to the owner of a concrete instrument for its use, or of "interest," paid for the use of "capital," a sum of abstract value.[1]

(4) The form of the capital item, like the nature of the income yielded (see No. (3)) is immaterial to the theory of capital and interest. In particular, the theory fits the case of the original "wage fund" conception of capital as the "support" of labourers. It is, however, necessary, if one is to have any theory of imputation as between such capital and labour, to introduce the modification which is the "contribution" of Jevons, popularised in a muddled form by Böhm-Bawerk, and refined mathematically by Wicksell. This modification consists of noting that the "production cycle" involved in the theory (almost entirely unreal in life) must be variable and that a longer cycle calling for a larger subsistence fund must make possible a greater yield from the same labour (and any other productive instruments apart from the "subsistence" itself). Only so do we provide for variable proportions and diminishing returns in connection with the capital (subsistence), and in the absence of these features the production cycle adopted by managers would of course be zero in length.
(5) It is exceptional if ever that the capital account with a particular instrument really ends at the zero point. In

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[1] In the abstract it might have been thought unnecessary to explain to "economists" that rent and interest are different contractual forms for the same income, and not payments for different kinds of services or different distributive "shares." But they generally have been and generally still are treated in economic literature as the latter. Similarly, it might, in the abstract, have been supposed unnecessary to remark explicitly that the construction cost of any capital item will, with negligible exceptions, include payments in considerable proportions to pre-existing capital items or capital. The nonsensical assumption that capital goods are produced by labour or by "primary factors" other than capital itself, calls for reference because the writings of the Böhm-Bawerk school make this assumption.

It may be in order to note explicitly that the Böhm-Bawerk theory, or at least a theory correctly worked out along the same line, may be quite "correct" as an exercise in pure logic, i.e. with reference to the imaginary situations under discussion. The objection to it is that it has no relation to any typical case of capitalistic production, perhaps strictly speaking, to any particular case in all history. Even as regards the very first infinitesimal increment of capital to be recognised at the beginning of economic life on earth, it would be merely fanciful to assume that it was produced under economic conditions by pre-existing "primary factors." Wicksteed, writing in criticism of Jevons, in 1889, thought it unnecessary to develop or dwell upon a remark which really includes most of what this paper consists in developing and dwelling upon. See his article, "On Certain Passages in Jevons's Theory of Political Economy," *Quarterly Journal of Economics*, Vol. III, pp. 219-314, reprinted in Robbins' Edition of *The Common Sense of Political Economy*, pp. 734-54; see especially the third paragraph from the end of the paper. I may remark that Wicksteed seems to me slightly over-modest in saying in the following paragraph that he has "made no attempt to carry the theory of capital and interest beyond the point at which Jevons left it."

all ordinary cases there will be an appreciable, and often a large, residual or salvage value to be carried over into an account with some other instrument, or into the general capital account of the owner.

6. Possibly at a somewhat lower level of obviousness than the observations grouped in the preceding section (but still obvious enough, surely) is the fact that in a property system the element in the increase in cost of a capital instrument under construction which represents the accumulating carrying charge cannot possibly be attributed (" imputed ") to the productive agents which contribute the other element in the cost, namely the summated direct outlays. It is of the essence of property, or in other words of capital accounting, that the part of the value corresponding to this part of the cost will accrue to the (owner of the) new instrument itself. This party to the transaction is functionally separate from the owners of the productive agencies external to the " growing " instrument, even if he happens to be the same human being. For purely theoretical illustration, let us assume that a capital instrument were to be constructed by the expenditure of a thousand dollars' worth of " labour " distributed uniformly through one year and that the interest rate is 5 per cent. per annum. The value of the instrument when finished at the end of the year will be $1,025. This $25 of " surplus value " over and above the direct outlay cost can only be imputed to the instrument itself, i.e. to the " capital " invested in it as this capital increases cumulatively. In the kind of world in which we live and think, there must be some such " bearer " (tangible or intangible) of the accumulating investment. This bearer at any stage of construction is a productive instrument, a capital good as well as a quantity of capital, and correct accounting must impute to it its rigorously definite share in the final result.[1]

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[1] This is an appropriate point to insert a reference which must be made somewhere to what is perhaps the most mysterious feature of traditional value theory, namely, the " labour theory of value," more especially in the form of the doctrine that " labour produces all wealth." (The doctrine pervading the whole classical literature, that production means production of wealth, is an equally mysterious idea, since the bulk of what is produced is always current consumption income, and this alone figures under the stationary conditions so dear to the heart of the theorist; in fact the production of wealth is a questionable category, for production naturally implies consumption, and there is no consumption corresponding to wealth creation, in the same or any other interval, for the income later yielded by the wealth must be imputed to the wealth itself, and not to the agencies which created it; but development of this theme would be too much of a digression here.) The point to be noted here is simply that as regards economic—not technical—rôle in production and distribution, no classification

7. The preceding discussion has run in terms of a capital account set up for or " with " an individual capital instrument. In a progressive society it is much truer to the essential relations to take the standpoint of a capital account " as such," i.e. an account in terms of the total quantity of investment or capital belonging to an individual or enterprise, without reference to the concrete instruments in which it is " embodied." From this standpoint, all capital is inherently perpetual. If a particular capital instrument " wears out," or for any other reason ceases to be " rentable," its replacement by another instrument or other instruments of the same earning power (with or without a growth accretion) is to be taken for granted as a technological detail. In accounting terms there is no difference between replacement and maintenance, " eventual "[1] replacement being included in maintenance as a matter of course. And, as a matter of course, it makes no difference for theory whether an instrument is replaced by one similar physically (or psychologically, in the case of intangibles), or by one dissimilar in any way whatever. Significant is only the fact (which is a fact) that the quantity of income-earning capacity in society as a whole is maintained or increased.[2]

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of productive factors has any validity. With reference to other issues, it becomes necessary to distinguish between *saleable* productive instruments and those which are not saleable, meaning in practice " free " human beings, which again, in modern society, means all human beings. This, of course, is a purely " institutional " difference. More technically stated, the difference between labourers and other productive instruments is that one of the latter type can be assumed to be the subject of a capital account, while this is true only to a very limited degree, if at all, of the free labourer.

As regards " land," it is sufficient to note that in economics, " bygones are forever bygones " ; any existing capital instrument must in fact be taken " as is." If one becomes interested in the history of an existing capital instrument as a question on its own account, it must be traced back either to the sort of productive activity here under consideration or to an economic discontinuity, or some mixture of the two, the typical situation representing a mixture in nearly any proportions.

[1] " Eventual " is, of course, used here in the European sense of " in the event."

[2] Under rigidly stationary conditions each instrument would of course be replaced by an identically similar one. Replacement by an instrument of a technically different kind or by one embodying a greater investment and corresponding productive capacity creates no difficulty for the theory of capital as related to a particular enterprise. We do have to assume, at least as a first approximation, and until other conditions are explicitly stated and dealt with, that the future earning capacity of a particular instrument is completely foreknown at the time of its construction. In that case it makes no difference what is the cause of any decrease in earning capacity, or what changes in the instrument, if any, are connected therewith. An instrument may, of course, be " written off," in whole or in part, out of earnings, and the investment so written off transferred elsewhere independently of any physical " wearing out " of the instrument. As a matter of fact, a large part of the capital of society is invested in intangibles not subject to physical wear or deterioration—though they may require expensive upkeep !

Indeed, it makes no difference to the general theory of capital, from the standpoint of the market as a whole, if the individual owner decides to disinvest and consume his capital. This decision will not affect the life history of the particular instruments in which the capital has been invested, and its only effect on the total capital situation in the society will be a slight redistribution of ownership, and the elimination of a small increment of growth which would otherwise have taken place. A capital item once produced becomes an indistinguishable fraction of the total capital of the economic system, and even in the event of gradual social disinvestment, it would be meaningless to attempt to say when or in what connection this particular increment ceased to exist.

8. The pure theory of capital and interest can be briefly stated in the form of a little simple algebra—i.e. for the special case of straight-line relations in construction and in yield. Let us assume that a capital good is constructed by the expenditure at a uniform rate of S dollars per year for C years, and that it will yield a uniform imputed return (above " upkeep " but without depreciation provision) of R dollars per year for L years. (The year and the dollar of course stand for any time unit and any money unit). Letting i represent the rate of simple interest per annum, the accumulation of one dollar per year for n years is given by the familiar formula

$$\frac{(1 + i)^n - 1}{i},$$

and the present worth of a future income of one dollar (payable at the end of each year for n years) is

$$\frac{(1 + i)^n - 1}{i\,(1 + i)^n}.$$

Letting, for simplicity, A stand for $(1 + i)$, i.e. for the " amount " (principal plus interest) of one dollar for one year, the fundamental principle of interest is expressed by equating the cost of the capital good with the present worth of its anticipated yield. That is,

$$\frac{S(A^C - 1)}{i} = \frac{R(A^L - 1)}{iA^L}, \text{ or}$$

$$SA^L(A^C - 1) = R(A^L - 1). \qquad \text{Equation I.}$$

This equation must be solved for i (i.e. $A - 1$) in terms of the

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—and no small part in physical things not subject to deteriorative change. (The special significance of *unanticipated* changes will be considered later.)

known quantities of the situation. As remarked, it is assumed that the investor behaves "economically," i.e. that he chooses that line of investment, of all those open in his market, which makes his i the greatest. With reference to the left-hand side of the equation, this means securing maximum capital value for the investment of a given value in payments to pre-existing agencies; with reference to the right-hand side, it means securing maximum yield from a given total investment, including in the investment the accumulated carrying charge.

But as already explained, the realistic way of looking at the matter is that of viewing capital once invested as perpetual, even when the instrument in which it is first invested happens to have limited life. The common-sense view of interest is that of a rate of return *after* maintenance of the principal intact. To represent this algebraically, we merely introduce a depreciation item, to provide for replacing the original instrument (or a "sinking fund" to replace the "capital") at the end of its service-life.[1] The simplest assumption is that it is built up by a uniform instalment out of the imputed income of the capital good in each year. The rate of interest, in this view, is simply the imputed yield for one year (R), less the proper deduction for depreciation (replacement—really maintenance) divided by the investment, that is, by the entire cost of the capital good. The annual instalment required to accumulate one dollar at the end of n years is the reciprocal of the accumulation of one dollar per year for n years, or

$$\frac{i}{(1+i)^n - 1}.$$

And the investment is, again, in our symbols,

$$\frac{S(A^C - 1)}{i}.$$

The expression for the interest relation then is:

$$i = \left\{R - \left[\frac{S(A^C - 1)}{i} \times \frac{i}{A^L - 1}\right]\right\} \div \frac{S(A^C - 1)}{i}. \qquad \text{Equation II.}$$

A few steps of algebraic rearrangement will show that this equation is identical with the preceding one. Such equations have to be solved by methods of approximation, and where accumulation and yield are not linear with respect to time (as of course they never would be in reality), the computation will involve integration.[1]

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[1] In the special case where construction period and service-life are equal, the capital goods are replaced as they wear out and no special accounting different from routine maintenance is involved. This was the assumption of the wage-fund theory in its simplest form, relative to an annual cycle. Cf. Smith, *Wealth of Nations*, Book II, Ch. III.

9. It should now be clear why the "length of the production process" has nothing to do with the case, and in fact no real meaning. As long as capital is maintained by replacing the capital goods, *if* their life is limited, by others of any form with equal earning capacity in imputed income, the durability or service-life of the good is a mere technical detail (and whether it is replaced by another like itself or different, and whether by the same individual owner or someone else, is likewise immaterial). "Of course," the longer the construction period of a given capital good, for the same investment of the services of other agencies, the greater will be the total investment after adding the accumulated carrying charge, and the greater must be the imputed income, for a given service-life or in perpetuity, in order to provide a given rate of return; and, "of

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[1] For continuous compounding at "force of interest" i, it is only necessary to replace the A in the equations by e^i, the amount of one dollar for one year on this assumption.

Since income is the primary economic reality, wealth being merely a source of or title to future income, and since in a stationary or growing society where the future is correctly foreseen, income is essentially perpetual, the truest view of interest is that of a stepping-up of *income* by abstaining from consumption and investing for some interval. The simplest situation is a case where the abstinence period or "construction period" is one year and the resulting capital good itself is permanent, so that in the equations C is unity and L infinity. Then either equation I or equation II immediately reduces to

$$\mathrm{i} = \mathrm{R/S}\ ; \ (\text{or, } 1 + \mathrm{i} = \frac{\mathrm{R + S}}{\mathrm{S}}),$$

where S is the cost of the instrument (equal to a year of income-flow at the annual rate S); R is the new increment of perpetual income due to the investment, in addition to the former income of S per year, which is resumed after the investment period; and $\mathrm{i} = \mathrm{R/S}$ or $\mathrm{S} = \mathrm{R/i}$ is the ordinary capitalisation formula. If C is not unity, S is replaced by $\frac{\mathrm{S(A^C - 1)}}{\mathrm{i}}$ and if L is finite, R must be reduced by the proper depreciation charge. (Payments may be made according to any consistent time distribution.)

The main proposition is easily seen without setting up any equations. The ordinary view of interest is the ratio between annual net income (after maintenance of principal) and the principal itself. But the principal of a new investment is some income for some period, a segment of the same income in perpetuity. So the interest itself is an increase in an income; and the rate of interest is the increase for one year divided by the base at the beginning of the year. When the base is a one-year segment of a previous uniform flow, no interest enters into it. Interest, then, in the most fundamental view, is the percentage by which a perpetual income can be increased in volume by abstaining from consumption of one annual instalment and allowing it to accumulate by investment in some income-yielding agency. ("Increase" was the ancient designation for interest.) The actual rate in any market is the measure of the best investment opportunities open in the capital market in question. (Cf. *Excursus* at end on interest in terms of supply and demand.)

course," the longer the service-life of the good, the greater must be the total (undiscounted) imputed income over the period as a whole in order to have a given total present worth. But it is completely artificial to fix attention upon the additively summated imputed return of a capital good for its service-life as a whole—even assuming that the service-life, and hence the aggregate service, are not infinite for the identical concrete capital good. The primary reality is income, a rate of service-value through time, and in a society which is not planning for the end of all things, all property income is perpetual. The significance of durability in an item of wealth is merely that the more durable it is the larger is its net yield, other things being equal, because a smaller annual deduction need be made from the same imputed yield to provide for depreciation, i.e. eventual replacement.

Thus in constructing any item of wealth, making it more durable is one way of making it yield a larger net return. It is " one way " among, be it noted, accurately speaking, an infinite number. There is literally no limit to the number of ways in which the investment in a given enterprise or project can be made to yield a larger return in value terms. It is taken for granted, of course, that any of the possible ways, including provision for longer life, will be used if and in so far as it does not cost anything, and if and in so far as it does not cost more than it yields. That is, the investment in *any feature* of a project which makes the result more " rentable " (including longer service-life) will be carried to the point at which further investment ceases to increase the rate of return as defined in the equations above. Similarly, using a longer period of construction is, *when it is used*, merely one method, among an infinite number, of reducing the total construction cost. It is a mere technical detail on the same level as any other detail affecting cost, and will not be further considered here. (Nor will the reasons, in nature, for the fact that time is a factor in the cost of any operation, that there is generally a " natural " or minimum cost speed which can be *increased or decreased* only at a cost.)

What the Böhm-Bawerk school's position amounts to is simply selecting these two details which are of the same significance as any of an infinity of other details, giving the two together the false designation of length of the production process or degree of roundaboutness, and pretending that this is all that is involved in the rational calculation and administration of investment. As a matter of fact, every one of the infinite number of such considerations is like this one in every significant respect. Increased rentability in any form must be purchased at an increasing cost per unit (one item in which *may* be a lengthened period of construction). In other words, increasing investment in any particular item or detail must yield " diminishing returns," or there will be no economic problem of investment.[1]

It is difficult to comment seriously on theorising based on such assumptions. Let us suggest a moment's scrutiny of an illustrative case, such as building a house. Truly, it is possible to increase one's net income from the house by building it in such a way that it will yield a given rental, above all current expenses (including upkeep but not depreciation), for a longer period of time. The reason, to reiterate, is that the rental yield in any income period must be reduced by a smaller deduction to provide for ultimate replacement, in order to arrive at the net return on the investment. The investor, behaving economically, will make his house more durable as long as the resulting increase in the net yield exceeds the general market rate of return on its additional cost, meaning merely, of course, that it is in excess of the rate of return obtainable on investment in any alternative opportunity open. (It is surely unnecessary to elaborate the assumption of a free or perfectly competitive market.) The same investor will naturally behave in the same way in the face of the infinitely numerous other ways of making his enterprise yield a larger return. As regards a house, these extend from building a bigger house to improving the finish of the door knobs. But all such things are only the beginning of his alternatives for investing more capital. He may build two houses instead of one, since what is included in a particular investment project is purely a matter of accounting convenience. Or, it may be a factory or railroad instead of a house, or a general assortment, accounted for as different projects, since the project as a unit is also irrelevant. In each of these possibilities, construction period and durability are *details*. The number of possible ways of investing more capital, apart from increasing the durability of instruments, is really an infinite number of infinities.

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[1] In its original wage-fund theory form, the Jevons-Böhm-Bawerk theory of capital assumed fixity of proportions between capital and labour in a fixed production cycle and gave investors no choice at all. Only in the application of labour-plus-capital to land were there alternatives of choice in proportion and an economic problem. The division of return between capital and labour was also treated as " fixed," in some way which we can only vaguely infer. Land rent is the one income for which a rational process of price determination can be read into the classical writers; it was wages-plus-profit which was really " residual."

Jevons and Böhm-Bawerk, as already noted, modify the theory by assuming (as Ricardo also really did, for that matter) that the production cycle is variable and that the use of a longer cycle yields a larger product from the same labour, while requiring a larger stored-up wages fund to support it. It is not clear whether even Wicksell contemplates different relations or curves in this respect from different investment opportunities open to the same investor at the same time. All the writers clearly argue or assume that increasing the time between production and consumption is the universal meaning of increasing investment.

There is, in fact, one significant theoretical difference between this investment in durability and the infinity of other modes open to any investor at any time (and between lengthened construction period and other costs). Time is measurable objectively, and the interest relation, with the peculiar compound interest curve, enters into the calculation of both the cost and the yield of any capital good. Hence many features of the time distribution element in cost and in return are calculable *a priori*, while technical and utility considerations and their curves must be derived from empirical knowledge of facts.

10. There is a connection in which the durability of capital goods, which is one of an infinity of details in its effect upon the amount of investment and size of return, does have the utmost significance on its own account. Economic life is carried on in a world subject to change, partly anticipated, and more or less accurately, and for a shorter or longer period before it occurs, but largely unpredictable. It is, therefore, of the utmost importance to have capital in such a " form " that it can be shifted from one field of use to another. Most capital goods, viewed concretely, are more or less specialised to particular uses. But in a general way, if the service-life of a good is shorter there is an additional degree of freedom in moving the investment in it into other uses, since it is possible to invest the replacement fund in an instrument of a different kind.

There is no simple or definite relation between service-life and mobility, and the limitations on the achievement of mobility through choice of short-lived forms of investment particularly need emphasis. Only within narrow limits can a particular, short-lived instrument be " liquidated " without liquidating the entire technical organisation in which it is used, or at least carrying out a far-reaching transformation in the set-up as a whole. The limitations apply especially to unanticipated changes, and, in the main, only unanticipated changes are in point at all. All capital is inherently completely mobile with respect to any change foreseen as to date and character at the time the investment is made. That is, in the absence of miscalculation, no investment will ever be made unless the yield, during the period in which it will actually afford a yield, has a discounted value equal to the cost.

Since there is so much confusion regarding the significance of durability, it may be worth noting that construction for an emergency or a dated special occasion of any kind is likely to run in this regard to one or the other of the two extremes. It will take the form in part of instruments which will depreciate as nearly as possible to zero within the limited period in question and in part of highly durable units, with the maximum value for recovery and utilisation elsewhere. The second course, again, may involve either adaptation for some other special use, or standardisation for building into a wide range of complexes such as are generally met with. The general principle is that the mobility of capital is overwhelmingly a matter of planning for either a particular transfer or for mobility in the abstract, through general availability; it is completely mobile with respect to any correctly anticipated change, and with reference to unforeseen changes its mobility is in general rather limited. Of course, prediction has the dimension of distance in time as well as that of accuracy.

In other words, an important, if not the main, factor actually determining the choice in investment between capital goods of different degrees of durability is what is loosely referred to under the term "uncertainty" (not to be confused with insurable risk), rather than efficiency. It would probably pay to build capital instruments with much more durability than is generally done if their construction could be *accurately* adapted to *remote* requirements. And presumably they *would be* made more durable, if the investors had more confident predictions regarding the future, however accurate their predictions turned out to be. But unforeseen changes may increase as well as decrease rents, and the greater gambling element in operations looking to the distant future may attract as well as repel. Any simple general statement regarding the human reaction to uncertainty is mere guess and assertion, and there is no clear meaning of "rational" behaviour in the face of uncertainty.

11. In the real world the relative economy of instruments of different durability is distributed more or less at random in relation to other types or sources of rentability. That is, while there is perhaps some technical interconnection between increasing the durability of an instrument and giving it

enhanced power to render saleable service in other respects, the correlation is certainly not high; and in general there is no serious limitation on the possibility of combining any degree of durability with widely varying degrees of other qualities making for efficiency in a " particular use " (whatever that may mean in reality) or making for efficiency in general. The limitation is probably negligible, when we recognise the freedom of investing in different " uses." Similar statements hold for increased construction period in relation to other costs. It is imaginable that this might not be true, that the economy from increased durability of instruments or increased construction period, or both, might be so great over so large a part of the productive field as to give rise to a " premium on present enjoyment " as a real factor affecting the choice. In a society in which conditions are as they are, and in which a large part even of the net return from investment is continuously reinvested, no such premium can arise.[1] Where a sufficient proportion of the investment opportunities open afford their maximum rate of return in connection with a moderate construction period, i.e. period of postponement of setting-in of income in consumable form in excess of cost outlays, and where the continued, fairly rapid growth in the total of investment is taken for granted, the only prejudice against investment involving remote realisation is the uncertainty or "risk" connected therewith. In reality most investments not only begin at a fairly early date to yield their income in consumable services (rather than increase in sale value—i.e. the "construction period" is of moderate length) but in addition they begin fairly soon to yield more than interest on cost in this form, and entirely liquidate themselves in a moderate period of time. This additional flow of consumable services is ordinarily treated as a replacement fund, but is available for consumption or for reinvestment in any form and field of use at the will of the owner.

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[1] (Excursus on Discount of Future.) There is literally no " sense " in the notion of an inherent reluctance to postpone, or preference of present to future enjoyment, as a general principle embedded in human nature, rational or sentimental. Jevons saw this clearly. No one wants his present or immediately prospective enjoyment all transferred to the future, but no more does anyone want all his future enjoyment transferred to the present. There is no presumption, *a priori*, as to which a normal human being would choose if compelled to consume both to-day's and to-morrow's rations of food either to-day or to-morrow. Either alternative would in general mean a sacrifice in comparison with consuming to-day's rations to-day and to-morrow's rations to-morrow. If we think of months instead of days the sacrifice is serious, and if we make it years it will be fatal. In a world where " food " is scarce and where technical facts enable one to have an increased ration to-morrow or next year in exchange for any portion of to-day's or this year's ration, there is a presumption that, *other things equal*, some postponing will be done—*in comparison with a uniform distribution through time* as a base-line or zero point. But other things are far from equal. Life is short and youth shorter, and both are uncertain as well. The permanent and cumulative saving and investment we actually and typically find in the world cannot be explained in any degree through comparison between present and future enjoyment, or " waiting " and being paid for waiting. It is hardly possible that the average saver lives long enough for the total return on his saving at ordinary interest, and with allowance for losses even in " safe " investments, to amount up to the income sacrificed in saving, if the whole return were consumed, and it is not. The difference between consuming now and after one is dead is hardly to be viewed as a mere difference in time, and consuming in the infinite future is mathematically identical with not consuming at all. The only possible basis for interest theory is simply to assume some indifference curve between current income as consumption and as increase in wealth. Wealth, viewed socially and objectively, is perpetual income capitalised, but what it means psychologically to the individual accumulator is a problem outside the sphere of the price theorist. All that the individual can do is to invest at the market rate, determined by technical opportunities open, whatever fraction of his current income he prefers, on such terms, to have in the form of wealth rather than in the form of current consumption.

In such a world the ordinary operations of the market bring about complete equality in the rate of net yield of all investments, regardless of the distance in the future at which they will yield a return in consumable form. The owner of any durable or non-liquid investment can always realise the yield accruing in the form of capital increment in consumable form instead, by selling to someone else a part of his holdings, or, if they are physically indivisible, by creating a lien. And, conversely, of course, the owner who gets his return in the form of consumables and desires to keep on accumulating, can always reinvest. In such a world, to repeat, the accounting view, which is the logical view, is that all investment is perpetual, yielding a uniform net income in consumable services throughout future time. The alternative to perpetuation of the income, barring loss through miscalculation (which involves an economic discontinuity) is the reverse process or disinvestment. But in a stationary or growing society disinvestment by an individual owner in no wise involves actual reconversion of "capital" into income, i.e. of perpetual income into income for a short period at a correspondingly higher time rate.

12. The distinction between capital and income is logically absolute, lying at the very conceptual foundations of a property system, and the imputation of product cannot be carried across a transformation of either into the other. When new capital is created, a new source, quantitatively, at least, of income appears on the books. It is true that when such a new income source appears as the result of economically planned activity, involving the use for this purpose of resource services

deliberately diverted from use in creating currently consumed income, the capital value created is quantitatively equivalent to the consumption income sacrificed in its creation, and must be accounted for as income for the interval in which its production is carried out. But, as was remarked above, such accounting " income " belongs to a totally different category from income in the sense of consumed services. As Professor Fisher in particular has pointed out, such income is merely the present book value of consumption income due to accrue in the future, and to count the present worth of a future income as present income and then count the future income itself is logically a clear case of double counting. Without in any way questioning the necessity of balancing the books in the current interval by treating the new capital as income, it none the less remains true that there is a fundamental difference between the use of productive capacity to create more productive capacity and its use to create consumption income. The choice between the two uses is absolute. The new, " future " income, when it comes to be created by the new capacity, can in no wise be imputed to the old capacity which created the new capacity; it has to be imputed to the new capacity! When savers, in investing, " abstain " from the current consumptive use of productive capacity in order to create consumption income in the future, they *abstain* ; to call it " waiting "—a change introduced a generation ago as an " improvement "—is misleading and false.

No definite or finite amount of the absolute quantity of consumption services produced by a capital instrument or increment of capital can be connected with the activity used to create the capital. The only imputation possible would be that of a " strip " of perpetual income, and this would be possible accounting procedure only for an accountant balancing the books " as of " the end of time. The only quantitative or logical bridge between a capital-producing activity and the income from the capital produced is the discounting process; and if the bearer of future consumption income is treated as product in the period in which it is created, the consumption income itself, when it begins to accrue, must not be imputed to the same activity. New capital can be treated as income only when the books are balanced and new accounts opened for a new interval, a real new beginning.

13. Regarding the " length of the production process " as an independent problem, several distinctions must be drawn.

It is, of course, possible to time any particular transformation of material between the " raw " and the " finished " state, whatever the nature of either. It will hardly be contended that this interval represents the time spent in " producing " the finished good. It is possible also to time the construction of a " capital good," meaning an auxiliary instrument of some kind not thought of as being directly consumed, but rather as serving in the transformation of other material from a raw to a directly consumable form. It is possible also to time the " using up " of such a capital good (in those cases where it is in some defensible sense used up; as already noted, a capital instrument is rarely if ever completely used up). And, one can add the construction period and the using-up period for any instrument, if one has sufficient curiosity to justify the effort. What it would mean is a question; the dates might be of interest to a historian of some sort; they certainly do not bound a " period of production."

The patent fact is that we may give a fairly realistic or defensible meaning to either the beginning or the end of a production process, but that if we do identify either, it is never possible to say what would be meant by the other boundary. If we take a certain small increment of consumption, say, drinking a glass of milk, it would never be possible to give any sensible answer to the question when that glass of milk was produced, or when its production " began." Or, conversely, we may take a definite increment of productive activity, such as feeding the cow; then, it would never be possible to say when the results of that increment of activity would be consumed, or when the process of consuming them would " end." If production is regarded as a process occupying time, its only beginning is the beginning of time, and its only end is the end of time—or, we might say, the beginning and end of social economic life. In the only sense of timing in terms of which economic analysis is possible, *production and consumption are simultaneous*. For the production of new wealth there is no corresponding consumption, and if there ever is or ever comes to be absolute disinvestment, there will be no production corresponding to the excess of consumption over production which results.[1] The technological process of producing and using up any particular thing is time-consuming, beginning when the account with that thing is set up, and ending when the account is closed, but this interval has no relation to a time requirement for producing any particular item of enjoyment.

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[1] It is to be noted that there is no correspondence even between the cost of a capital item and the possible realisation, unless its creation is planned for realisation at a known date and under known conditions. Nor is there any relation between the annual maintenance cost of an item and the amount of deterioration it will undergo if not adequately maintained.

Viewed in economic terms, production means the rendering of services, and it is self-evident that a service can only be produced when it is rendered, and only enjoyed or consumed at the same instant.[1] A service which creates value other than instantaneous enjoyment does so by creating some form of capital which will subsequently *produce* enjoyment, and it cannot be considered as produced twice. In economic life apart from new net investment or disinvestment for the system as a whole, consumption and production are instantly simultaneous. In a growing society (growing in the sense of capital accretion only), that part of production which results in new capital is continuously and instantaneously balanced on the books by the new capital created. But no consumption *ever* corresponds to such production, and it is production only from the standpoint of accounting for, and directing, the utilisation of productive resources used for capital growth.

14. The connection in which the notion of a lapse of time between production and consumption has practical meaning has been indicated in general terms. It does require time to change the direction of production or the mode of use of productive instruments, or the capital they represent, to meet *unanticipated* changes in conditions. (Only capital instruments and capital are in question in the present discussion; the problems of the mobility of labour are quite as important, and indeed closely connected; but they have to be treated separately.) It is commonly true that changes in the character of productive activity become reflected in changes in the physical form of consumable output only after a considerable lag. There is no disposition to minimise the importance of studies which in any way shed light on such relations or on the rationale of production control where lags are involved. This problem has almost endless ramifications. Some of the speculations of the Böhm-Bawerk school about capital have

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[1] The entire classical conception of production, rejecting services and including only the creation of additional wealth, is exactly inverted. Cf. J. S. Mill, *Political Economy*, Book I, Ch. III, Section 4, first sentence of second paragraph. Smith, apparently, meant to include the *reproduction* of capital: *Wealth of Nations*, Book II, Ch. III. Ricardo uses the concepts of productive labour and productive consumption without attempt or pretence at definition, but may be assumed to accept Smith's position.

more or less bearing on the problem in one aspect or another, though there is only a vague general relation between (*a*) quantity of capital, (*b*) durability of instruments, and (*c*) (im)mobility. And such lags in no wise measure or mark off time boundaries of production as such, or of any specific process of production. They are to be studied simply as what they are, lags in the changes of form or rate of output behind changes in the input of productive services.

In economic terms, i.e. value terms, what is " produced " by any activity is an increment of value; and if economic activity is rationally directed under conditions of perfect competition, to every increment of activity will correspond an instantly simultaneous equal increment either of consumption or of new wealth representing present worth of future consumption—which, however, will be accounted for as product as it is consumed. This double counting is, as noted, essential for the rational control of capital creation and use.[1] Any unanticipated change in conditions will create a discrepancy more or less extensive and widespread between the historical cost of capital instruments and their value on the capitalisation basis; it should go without saying that in any such a case, the historical cost will be treated as if it did not exist. The amount of capital is always the capitalised value of an expected future stream of services. When conditions change, capital simply appears or/and disappears, and is written up or written down without reference to " production." Such an event is not a part of the economic sequence, which consists of acts correctly related to consequences, but represents a discontinuity. Capital is perpetual in so far as economic principles obtain and economic reasoning is applicable—and will be so until investment plans begin to be made with reference to the end of the world or some millennial state, in which wealth and income will cease from troubling. Wealth is bought and sold (as well as created) and gets its measure as wealth on the basis of perpetuity ; any " risk " involved in any case is allowed for and cancels out in the large in so far as risk itself is measured or correctly estimated and treated rationally, " economically." The reason for keeping records of historical cost is merely that

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[1] There should be somewhere in this paper a general reference and acknowledgment to Professor Fisher's writings on capital and income. But detailed comparison is outside the scope of the enterprise. Fisher's *interest theory* is a different matter. Cf. *Journal of Political Economy*, April 1931. (This article contains errors, which the writer hopes to take up and correct in the near future, but the main argument on interest theory is still believed to be sound.)

knowledge of the past is the only source which human beings have of knowledge of the future. But in so far as they have correct knowledge and direct their capital creation in accord with it, cost will be equal to capitalisation value, and the tendency of the two to be equal is the basis of the general theory of capital in a system in which it is being created under economic conditions. For the rate of interest which determines the value of all existing capital goods is determined exclusively at the margin of growth, where men are comparing large, short segments of income-flow with thinner streams reaching out to the indefinite future. Action is based on the assumption that the capital itself, the earning capacity, will be intact at the end of any project limited in time, if not as a separate act, "disinvested." Disappointed expectations are not explicable in terms of economic sequence, which means the maximising of return from limited means by correct allocation among competing uses. The quantity of capital in an existing thing depends on the rate of interest and its earning power in any field in which it may have earning power, in that in which its earning power is greatest if it has such in a number of fields.

15. As regards the relation between quantity of investment and the time required for production, a few remarks on possible meanings and the probable facts may shed light on certain confusions. (1) In connection with the initiation of a new "line of production" (whatever that may mean), there is little doubt that *ordinarily* a greater investment in more elaborate preparations will mean that some number of the earlier units of output will come on the market at a later date than would have been the case with a smaller investment. But additional investment may have the purpose and result of shortening this waiting period; and in any event it is only a question of time until the total output reaches a figure which would only have been achieved at a *later* date using less capitalistic methods. Otherwise stated, production will presently arrive at an *n*th unit which reaches the market at an earlier date, and the longer production is kept up the greater will be the interval by which each succeeding unit is advanced in time by the investment.[1]

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[1] Any net saving and investment naturally means a temporary reduction in consumption somewhere and a subsequent increase somewhere, raising the total rate of consumption in the system above that obtaining before saving started, the increase measuring the rate of return. In terms of *income* sacrificed for an interval and ultimately more than made up, the notions of roundaboutness and waiting have some meaning,

(2) Increased capital investment may either increase or decrease the length of time required for the processing of any particular material, from beginning to end or between any two physically definable stages.

(3) Increasing investment in any field may go with either an increase or a decrease in the durability of the capital instruments used, or in their construction period, or in the sum of the construction period and service-life. There is probably a slight empirical correlation between amount of investment and both service-life and construction period; for making instruments more durable *is* one way of investing more and securing a larger total return, and the minimum cost of more durable construction probably goes with a longer construction period on the average. (4) More durable instruments *tend* to involve immobility over a longer period, and with correspondingly increased risk (if not certainty) of throwing away unused potential physical capacity when they come to be discarded and replaced, somewhere, in some form. This fact undoubtedly works in favour of the choice of shorter-lived rather than longer-lived instruments in many cases, as where products are subject to frequent unpredictable changes in style. And in such fields as heavy industry, increasing investment carries with it a tendency to increasing inflexibility and risk of loss through shrinkage of demand for the product. It probably takes longer, and/or costs more, to contract than to expand in such cases, and this fact is certainly significant for cycle theory. But, again, the effect of uncertainty is itself uncertain. And labour immobility is probably at least as significant in cyclical stoppage as is immobility of capital, and price inflexibilities (including wages, rent, etc.) are surely more important than either; but the issues raised are outside the scope of the present discussion.

16. The argument regarding the theory of capital as time may be summed up by pointing out that the theory rests on three fallacious assumptions. The first is that capital is produced (and reproduced in any sort of cycle) by labour or " primary factors " in any sense. This is palpably absurd; " labour," " capital instruments," and " land " are in the first place categories of no homogeneity within themselves and of extensive overlapping, and in the second place, however productive agencies may be classified, it is evident that each is

though the individual who gets the excess, after twenty years or so (considerably more, unquestionably, on the average), will generally not be the one who did the " waiting."

produced and continuously reproduced (when at all) by the co-operation of all, including itself. (Completely durable instruments, if there are any, form an exception as regards reproduction, unless the supply is being increased; they form no exception as regards original production in so far as they originated under economic conditions.) The second fallacy is the equally absurd notion that the *re*production of instruments of any kind can be considered as economic production. There is, " of course," no product yielded by an agency until after full provision has been made for maintaining it, or the investment in it, intact, in the value sense. Replacement, if and when, and to the extent that, it happens to be involved, is distinct from routine maintenance only in technical detail. The difference is irrelevant for general theory, except as regards mobility for meeting unforeseen changes, and the connection between service-life and mobility is vague and narrowly limited at best. (Let us take the space to repeat that in liquidation an entire technical production unit will generally be largely involved; also, that the mobility of investment is generally and mainly a matter of correct foresight and planning.)[1]

The third fallacy (in the theory of capital as time) is the notion that the product of a capital instrument (determined by imputation) is or can be treated as the product of the economic activity creating or reproducing the instrument itself. This is admittedly not quite so palpable as the other two fallacies. But it is surely obvious that the net yield of an instrument cannot be counted *both* as the product of the instrument and as the product of the activity which created it. And if this is admitted, it is surely not open to serious discussion which of the possible alternatives must be chosen.

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[1] The only possible conception of capital production which does not limit it to additions to the total capital in a system must include all productive activity which does not immediately yield a direct want-satisfying service. (The rearing and training of labourers must be treated as pure consumption unless the labourers are treated as capital by setting up appropriate accounts, which is impossible in a free society.) A large part of capital reproduction and some new production is routine maintenance (over-maintenance) or upkeep and the result cannot possibly go through the current market. Another large part, involving technical production of instruments for replacement, does not go through the market, as production is organised. In view of these facts, and of the general principle that the value of any capital instrument is a mere result of capitalisation, with allowance for a market estimate and evaluation of " risk," it is hard to see how a concept of a price level for capital goods—as used, for example, by Mr. Keynes—has any intelligible meaning.

Excursus on Interest in Terms of Supply and Demand

Since capital is merely anticipated income, capitalised at a certain rate, and since the production of any concrete item of capital includes, in addition, an element of interest, a discussion of the capital concept should include some development of the theory of the interest rate. The foregoing treatment has not attempted to go behind or beyond the fact that, in general, capital instruments are produced and reproduced at a cost, fixed by technical conditions in the situation, with the consequence that the value, or the quantity of capital represented, is theoretically determined by cost, in some sense. The equality between this cost-determined value and the value as determined by discounting anticipated yield was shown to involve a mathematical theory of the interest rate in any investment operation. (Of course, the only cost which determines the value of any *existing* capital item is " reproduction " cost, and not necessarily the cost of producing a physical duplicate, but the minimum cost of producing an " equivalent " item, i.e. an item which will yield the same net perpetual value return.) No statement that a value is " determined " by a cost should be allowed to stand without some examination of the shape of the cost curve, since it goes without saying that only under conditions of constant cost can cost be said to determine price, without taking into account the simultaneous influence of demand and the equilibrium between the two. On the other hand, it should also go without saying, at this date in history, that when cost is constant, it does " determine " price, meaning that the price will be equal to the cost (if the commodity is being produced at all) whatever the nature of the demand may be. The algebraic analysis given above (p. 266) assumed that an investment is made under the most favourable conditions technically open in the market or economic system in question or, in other words, that the resulting net perpetual money income is produced at the lowest possible cost, including interest during construction. We shall now undertake a brief survey of the problem of the cost curve for net perpetual income or, in more general terms, of the theory of interest as a problem of supply and demand and equilibrium.

For several reasons, discussion of the problem of interest in terms of supply and demand requires especial care. In the first place, both capital and income are measured in monetary units, and either may be regarded as the commodity, with the other as the price; we may think of the interest rate, meaning a perpetual income expressed as a fraction of the capital, as a demand price for capital, or of capital as the demand price for perpetual income. In addition, it must be kept in mind that in reality the flow of capital into the market in exchange for perpetual income is itself a rate in time. As is the case in all equilibrium price analysis, the equilibrium price is one at which a commodity flows into the market and out at the same rate. There are many possible ways of drawing supply and demand curves to analyse the behaviour of the capital market. In the present connection, it seems best to consider only the conception which is simplest and most fundamental. This means taking the view, which has been taken throughout the foregoing pages, that a capital instrument is desired, bought, valued, and produced (when produced) as the embodiment or bearer of a known net perpetual income. Production of " capital " means the production of such capital instruments; thus, it is best to consider perpetual income, or capital goods measured by the perpetual income which they yield, as the commodity, and the savings of the investor as the price. Supply, then, means the amount of new perpetual income (in dollars per year) created per unit of time, and demand the net savings brought to market per unit of time and offered in exchange for such perpetual income. Price is to be thought of as " years' purchase."[1]

Capital (in income-yielding capital instruments) is a commodity produced at a cost, and its supply curve is a cost curve. That is, in so far as there is any economic " theory " of supply in the case of capital,[2] it rests on a cost curve measuring the value which the productive resources used in creating any capital item would have in the only other alternative market use, namely the production of current consumption income. Price equilibrium in the field of capital production means such a rate of interest that savings flow into the market at precisely the same time-rate or speed as they flow into investment producing the same net rate of return as that which is paid savers for their use. This rate, again, will make equal the " marginal utilities " of the current income sacrificed by the savers and the prospective perpetual income.

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[1] Both magnitudes, as must be kept clear, are assumed to be measured in monetary units, " dollars." The dollar is taken arbitrarily as the unit of value. The special problems raised cannot be taken up here, but one point must be emphasised : Value itself is a property of consumption income, not of wealth—of a stream or rate of flow, not a thing existing at a moment. Wealth is always a derivative category, involving the rate of interest ; it is always capitalised consumption income. As suggested on an earlier page, the primary economic reality (utility or want-satisfaction) must be thought of as a flow, but not a flow " of " anything which can exist without flowing. It is like light, not like, for example, water. The notion of a quantity of wealth involves not merely integration over time as in the case of light (candle-power hours, or lumens), but in addition the process of discounting ; for wealth is always relative to *future* income with respect to the moment at which the quantity of wealth is " struck," its " value " determined, and the distribution through future time vitally affects the value.

[2] This question of the extent or limits of the validity of any theory of supply would call for extended discussion, impossible here. It is in order only to make clear the assumption, that any " economic " cost, any cost which can be said to be equal to economic value and to determine the latter in a general quantitative sense, is alternative-product cost. That is, it represents the payments to productive resources which would otherwise be used, at the margin, to create some " other " product of equal market value. The limitations of such cost theory are rather sweeping ; other margins corresponding to other uses of productive capacity are very commonly operative, but these non-market alternatives are valued only individually and subjectively. Similar limitations apply in principle, but much less extensively in practice, to utility theory on the consumption side. The notion that price measures marginal utility is valid as a general proposition only for a society in which every consumer consumes every product and is free to change the proportions of different products in his consumption budget continuously, instantly, and without cost.

The theory runs in terms of net additions to total investment. Such additions need not be of considerable positive magnitude, and may even, within certain limits, be negative, without invalidating the argument. The heart of the matter is that if there is a *highly elastic* opportunity generally open for converting " present wealth " (really a large income for a short period of time) into perpetual future income, the terms (rate of interest or years' purchase) on which this conversion is possible will strictly " determine " the terms on which all exchanges between present and future income or wealth will be effected, regardless of the volume of the latter. That is, " consumption loans " are to be completely disregarded in the causal analysis. (As a matter of fact, consumption loans can never be of very great volume in any system, in comparison with production loans, since in general the amount of adequate security for a purely consumption loan is extremely limited; but this point need not be laboured.) It is necessary only to understand the meaning of elasticity in the statement above, and the fact that the elasticity is actually enormously high; in fact it is infinite, as regards the situation at any instant of time.

In the view of the interest relation here taken, with income the commodity and capital the price, the elasticity in question is elasticity of supply, high elasticity meaning an approximation to constant cost. That is, high elasticity means that a given fractional variation (say, 1 per cent.) in the amount of perpetual income produced in unit time (the amount of saving and interest) will result in a relatively much smaller fractional or percentage variation in the " price," i.e. the " cost," i.e. in the present case, the amount of " present wealth " which must be sacrificed to produce an additional unit of perpetual income. If the second fraction is zero, i.e. if investment results in no change at all in the terms of investment, we have rigorously constant cost, and cost rigorously determines the price, years' purchase of income.

That changes in the rate of saving and investment produce relatively little change in the rate of interest in a moderate period of time, and absolutely none without the lapse of some time, is a proposition which does not need much arguing. New investments represent additions to all the investment previously made in all past time. The amount of such investment cannot indeed be stated quantitatively in any other way than as the capitalised value of existing income sources under existing conditions. But no uncertainty in measurement affects the fact that the addition made in any short period of time is relatively small. No one who knows anything about the use of capital in industry needs to be told that the possibilities of further investment are practically unlimited, even in the absence of other social changes opening up new fields of " demand for capital,"—in the present view, new opportunities for creating perpetual incomes without increase in their cost. At least it is obvious that the rate of interest, or productivity of capital, could never reach zero, since there is rarely any ultimate limit, even in an individual industry, to the possibility of increasing output by further investment. The interest rate could be zero only if all products known, empirically or in imagination, into the creation of which capital in any way enters, were free goods. The only question has to do with the amount of fall in the rate of yield which would result from a given amount of capital investment. In the first place, we must assume no other change to take place. Some idea of the scale of the magnitudes involved may be gained by suggesting as a guess—probably a conservative one for our argument—that doubling the total wealth of society would halve the rate of return. (This does not mean " unit elasticity " in the correct technical sense, but the argument is the same.) On this supposition, the interest rate would fall logarithmically to about half its initial value, each generation, assuming also the highest rate of saving observed in " boom " times.

The proposition that the rate can only change through time, not at all, instantly, is self-evident, but calls for a little discussion to clear up the contrast with the treatment of price equilibrium in the case of commodities, as a timeless or instantaneous phenomenon. In reality, the price of a commodity such as wheat is subject to the same principle ; forces operating to produce change could only become effective at some finite speed. In the case of a commodity such as wheat, however, the effect can theoretically be treated as instantaneous because the theory relates to an *equilibrium* price, and there is at any instant an equilibrium price corresponding to conditions at that instant. Equilibrium price theory is always supplemented by some theory of market price to explain discrepancies due to lags in adjustment. The theory of equilibrium price is relevant for a commodity because it can be assumed that the actual price does not diverge very much or very long, and is as likely to be on one side of the equilibrium point as the other. As a matter of fact, it is the equilibrium price which is the concern of producers in their plans, much more than the quoted price at the time plans are made.

In the case of capital and interest, all these elements in the problem are reversed. There is no equilibrium price which has any meaning, and the only price which theory can discuss is a kind of market price, though with some qualifications to be noted presently. It is true that the " Marshallian " theory of interest runs in terms of an equilibrium, and that Schumpeter has " developed " the doctrine by arguing, or asserting, or assuming, that the equilibrium point is zero.[1] Very simple considerations which cannot be elaborated here will show that while it is correct to argue that " other things equal " the accumulation of capital must tend to lower the interest rate, there is no reason for arguing that the process of accumulation at a descending rate would ever come to rest even with other changes eliminated. That the rate could never be zero, or probably even very near to zero, has already been remarked.

And it is fallacious, *a priori*, to argue that other things could possibly be equal. Apart from the inadmissibility of such an assumption, in view of the bare fact that the time over which other changes would have to be abstracted is indefinitely long, there is the further fact that the accumulation of capital immediately involves effects which change the conditions of accumulation. It is needful to mention specifically only one of these: accumulation and investment must increase the real income of society (if not of the savers, then of others), which will make saving easier, and there is no reason, *a priori*, why this change alone might not counteract the effect of the reduced incentive to save in the form of a progressively lower rate. Other changes are of course involved which would work in the same direction, and in fact it is an almost purely arbitrary assumption that a reduction in the rate of interest will result in a lower rate of accumulation, even if everything else were absolutely unchanged. Historically, new " demand for capital " has opened up rapidly enough to prevent any general fall in the interest rate.

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[1] Cf. Lionel Robbins, *Economic Journal*, 1930, pp. 194-214, especially 211 ff.

The primary fact, oversight of which vitiates most discussion of the theory of interest, is that the only situation of which we have any knowledge in capitalistic society is one in which total investment is growing at a fairly rapid rate; the only time when this is not clearly true is when conditions are dominated by war or the economic disorganisation called " crisis," so that the ordinary price relations and controls are inoperative. The heart of a correct theory of interest is the fact, corresponding more or less to infinite " elasticity of demand for capital," that the investment market is capable of absorbing savings at the maximum rate at which they are forthcoming, with only a very gradual decline of the rate of return through time, other things equal, and the further fact that changes which do occur in the " other things " (partly in consequence of the growth of capital, but effects in a " historical," not an economic sense) actually prevent any general decline. With opportunity to invest to an indefinite extent and at a practically unvarying rate constantly open, no one will pay more or take less for any sort of loan than the rate obtainable by investment at the margin of capital growth.[1]

The false impression that this quasi-elasticity is fairly limited may be accounted for by failure to consider a theoretical limitation on the notion of an instantaneous market rate already alluded to. It is true that the market cannot instantly adjust itself to rapid, *unanticipated* changes in the rate of flow of savings into the market without changes in the rate. This is purely a matter of planning and uncertainty and the effect of imperfect foresight. It requires time to plan for investment, and at any moment investment (actual construction of income-bearing goods) is being carried on at a fairly definite rate. If savings suddenly begin to come into the market much more rapidly than the rate planned for (whether correctly or not) by entrepreneurs and promoters in the aggregate, a temporary " glut " and fall in the rate will follow naturally. And, conversely, if the flow of savings is too slow to carry out the plans actually in course of execution, a sort of distress demand will send the rate upward. Such facts as these undoubtedly enter into Professor von Hayek's confusion regarding the relation between the length of the production process and the analysis of the business cycle. But under no conditions is there a valid basis for arguing that either more investment, of itself, or more rapid investment, need be associated, *either* with investment in more durable instruments, *or* with a lengthening of the construction period.

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[1] This would be true with little qualification even in a retrograde society, but that is not in point here.

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The Expansion of Credit in an Advancing Community

By R. F. Harrod

The question has been much discussed recently whether in an advancing community it is desirable that the general level of prices should remain constant or fall in proportion to the increase in the flow of goods. Grave difficulties beset any attempt to define the general level of prices, and these apply in connection with either desideratum. When a fall of prices is considered, the weights used in the index number of prices should, of course, be the same as those used in defining the increase in the flow of goods.

The following paper is divided into two parts. The first contains a brief summary of the considerations affecting the choice between the two alternatives. The second is concerned with some misconceptions with regard to the distorting effect on sectional price levels that an increase in the quantity of money by an extension of producers' credits has been supposed to produce.

It may be observed that this is not primarily an essay in trade cycle analysis. It is an enquiry into the relation between the rates of increase in a regularly advancing society, with a view to determining what kind of system would allow the full potentialities of progress to be realised while being internally self-consistent. The second section professes to throw some light on trade cycle theory by demonstrating that an alleged cause of fluctuation is not a true cause.

I

It is not proposed to go outside the limits of a stable price system on the one hand and a system in which the quantity of money is kept constant on the other. Since the hypothesis of an advancing community seems to preclude a diminishing flow of goods, a rising price system will not be considered. A constant money system is defined as one in which the flow of money is such that the general price level moves down at the same rate that real aggregate income increases, it being assumed that changes in the velocity of circulation or changes in the amount of work that money has to do through vertical integrations or disintegrations in the productive process are offset by appropriate changes in the supply of money.

It is possible that the true desideratum lies between the extremes set forth in the foregoing paragraph, and this will be considered.

If the constant money system is adopted two difficulties arise, which will be called the primary difficulty and the secondary difficulty. It is not suggested, however, that in the real world the secondary difficulty is the less important.

The primary difficulty is that connected with the fact that certain rewards to factors, e.g. to debenture holders, are contractually fixed in money for long periods. The secondary difficulty is that connected with the fact that factors, whose money rewards are legally and in principle adjustable, e.g. wage-earners, are often unwilling to agree to a downward revision. The difficulties arise when, under a falling price system, the consequential rise of real rewards to these factors in the absence of a monetary adjustment is greater than the rise in their real productivity per unit.

The secondary difficulty is so named because it is possible in principle, though it may not be in practice, to overcome it within the structure of our economic system, by persuading the factors themselves to agree to suitable revisions; while the primary difficulty is so named because it cannot be overcome without a change in the structure of the economic system under which we live. It is proposed to examine, first, the consequences of these difficulties when they do arise and, secondly, the conditions in which they are likely to arise.

1. The secondary difficulty arises when the productivity per unit of a factor, such as labour, does not increase at so great a rate as prices are falling. Under a constant money system this would occur when the productivity of labour per unit is not increasing as rapidly as aggregate income. Its consequences are well known and need not be dwelt upon here. Unless a downward revision of monetary rates of reward can be secured, it becomes impossible for the factor to obtain full employment and the regular economic advance of the community is impeded.

The consequences of the primary difficulty require more detailed scrutiny. Owners of fixed means of production are divided into two classes, those whose lien on the product of the fixed instruments is contractually fixed in terms of money over a long period, and those whose titles secure to them the remainder of the product. The primary difficulty arises when the fall of prices proceeds more quickly than the productivity, per unit, of the fixed instruments increases. Under a constant money system this happens, when aggregate income increases more rapidly than the productivity, per unit, of fixed instruments of production. The " fixed interests " then become entitled to a rising share in the product of the fixed instruments.

The occurrence of the primary difficulty entails two consequences, both of which retard to a serious degree the normal advance of the community. (i) The rate of bankruptcies is increased. (ii) The proportion of firms not earning a normal rate of profit is increased.

(i) Bankruptcy normally performs two important functions in our system. (*a*) It puts out of operation sources of production, the output of which, owing to unforeseen changes in the conditions of supply and demand, is no longer worth producing. (*b*) It eliminates the less efficient producers, thus tending to the survival of the fittest. The expression " healthy bankruptcy " has had some vogue recently. It is a valuable one if the adjective is used selectively to distinguish the bankruptcies which discharge these two functions from those which do not. It is misleading when the adjective is used as an undiscriminating tribute to all bankruptcies, as such.

The swelling up of the value of fixed money charges through a rise in the value of money increases the number of bankruptcies. Now it is well known that the existence of fixed money charges has economic disadvantages; ideally the whole ownership of fixed means of production ought to be of the " equity " form. For it is economically sound that fixed means should continue to be exploited, so long as the value of the product exceeds the prime costs. The existence of fixed money charges brings the operation of firms to a premature end, if and when the value of the product, while exceeding prime costs, does not exceed them sufficiently to meet the fixed charges. The system of incurring fixed money charges, though it may be best suited to eliciting the required supply of means of production, has the demerit of entailing premature death in many cases. The swelling up of the fixed money charge renders the deaths still more premature and must be set down as a notable disadvantage of a system of falling prices, if and in so far as that system causes the primary difficulty to arise.

It may be objected that the fixed assets of a firm can be sold on liquidation, and set to work again relieved of all or part of the fixed charges. But this is not necessarily so. Fixed means of production are of two kinds, the material and the immaterial, the latter consisting of the knowledge and experience embodied in the enterprise attached to the firm. The break-up of the firm divorces one form of fixed asset from another, and it may happen that neither can be profitably exploited without the other. Moreover, the immaterial asset is sensibly damaged by the discredit attaching to failure. It may be impossible for those who have to assess the value of the immaterial asset with a view to future collaboration, to determine how far a falling price system and how far inefficiency was the cause of failure. And valuable entrepreneurial ability may, in consequence, be lost to the economic system and run to waste.

(ii) The second consequence of the swelling up in the value of fixed money charges is probably still more detrimental. The number of firms earning sub-normal profits is increased. These firms are not likely to be able to secure capital for expansion. Opportunities may offer allowing a normal or super-normal return on the additional outlay designed to take advantage of them, but, if a firm is waterlogged by reason of fixed charges incurred in the past, it will have to let them go by. Even in spheres in which competition is " perfect," this may retard progress, for much enterprise being attached to the waterlogged forms, the supply of enterprise available outside them to co-operate with other factors of production is severely restricted; a section of the community's productive resources which should normally be available is put out of action. When competition is imperfect, the situation is worse. For the firms, or some of the firms, to whom alone the fresh opportunities offer, may be precisely those which are unable, by reason of their past obligations, to obtain fresh capital.

The patience and kindness of creditors and banks, while tending to ease the situation with regard to bankruptcies, does nothing to alleviate the evil due to the prevalence of sub-normal profits.

2. Next it is necessary to examine the conditions in which the primary and secondary difficulties might arise. Falling prices are associated with a rising aggregate real income. This can only be due to an increase in either (*a*) the quantity or (*b*) the power

of the factors of production. It is required to find the probable relation between an increase of income due to either cause and an increase in the productivity of the factor, the money rewards to which are not adjusted.

Consider first the primary difficulty. For a brief summary, it may be sufficient to use the classification of factors into natural resources, capital and labour. On the side of quantity of factors, income may increase owing to an increase in the quantity of capital and/or labour. A proportional increase of both increases national income, but does not normally increase the productivity per unit of existing fixed instruments. Then under any system other than a stable price system, the primary difficulty arises. If there is an increase in the quantity of capital greater than that in the quantity of labour, aggregate income rises, but the productivity of fixed instruments tends to be affected unfavourably. Again the primary difficulty arises. The reverse effect ensues, if labour is increasing more rapidly than capital. But I propose to rule that possibility out as being inconsistent with the hypothesis of an advancing community. Any increase of income, then, due to an increase in the quantity of factors, gives rise to the primary difficulty, except under a stable price policy.

An increase in the power of factors, due to forces, which may be characterised by the generic expression " technological advance," increases aggregate income. Now this technological advance may increase the productivity of existing instruments. Broadly, however, it is of the nature of a technological advance to be biased against pre-existing instruments. It is possible that it will not increase the productivity of pre-existing instruments at all; it is unlikely to increase their productivity as much as it increases the productivity of the community generally. Accordingly it is possible in these circumstances that the primary difficulty will arise under any system except that of stable prices; and it is very probable that it will arise under the system of constant money.

To summarise, an increase of aggregate income due to an increase in the quantity of factors—and this increase occurs even with a stationary population, if any net annual saving is occurring—will entail the primary difficulty under any system except that of stable prices. And an increase of aggregate income due to an increase in the power of factors *may* give rise to the primary difficulty under any system except that of stable prices and *is likely to* give rise to it under a system of constant money. In a normally advancing society in which the increase is due to both causes, the constant money system must give rise to the primary difficulty, but under a system in which prices fall at a considerably slower rate than income increases, it may be possible to avoid it.

At this stage it may be well to examine a possibility that has not so far been considered. It may happen that some of the fixed money charges have been incurred in a way that admits of " conversion " on to a lower interest basis. Make the supposition most favourable to a régime of falling prices, that *all* fixed money charges may, when occasion offers, be so converted. As this is an analysis of the economics of a regularly advancing community, it is proper to suppose that the market rate of interest is equal to the natural rate, and that conversion is only possible if there is a fall in the natural rate.

It is worth giving brief attention to the fallacy that a fall in prices is a sufficient condition for the possibility of conversion. If all prices fall, it might be argued crudely, the price of capital will fall too! But interest is " money for money," and a change in the value of money by itself makes no difference in the rate. If, for instance, capital and labour were increasing *pari passu*, and the only technological change was one which increased the power of natural resources in such wise as to leave the marginal productivity of capital and labour constant, aggregate income would also rise and prices under a constant money system would fall. The marginal productivity of capital and therefore the rate of interest would remain unchanged. But, it might be objected, the capital market may discount the future fall of prices and the money rate may stand below the natural rate by an amount sufficient to offset the prospective increase in the value of money. This is true, but irrelevant. If a fall of prices is confidently anticipated, the money rate will be *permanently* lower than it otherwise would be. But it will have no tendency to fall! And therefore no possibility of conversion will arise from this cause.

Possibilities of conversion will indeed arise, if forces operate to reduce the natural rate of interest. This may happen through an excess rate of increase of capital or through " capital-saving " technological improvements. It can be shown, however, that the existence of these possibilities does not affect the arguments of the foregoing paragraphs. For forces, tending to reduce the productivity of capital generally, are likely to reduce in similar measure the productivity of existing instruments of production. There may not be an exact parallelism; existing instruments may be more or they may be less injured than capital generally. It is fair to assume in the absence of special knowledge with regard to the change of circumstances, that it will affect both equally. But, if that is so, the possibility of conversion will not prevent the primary difficulty from arising. For the conversion will only reduce the fixed money claims in the same proportion that the real productivity of the fixed instruments is reduced. It will not also reduce them in proportion to the fall in the money returns accruing to a unit of real productivity. It will, therefore, do nothing to offset the tendency of the proportion of the return to fixed instruments, that has to be paid to the fixed money claims, to swell owing to the fall in prices.

It is important that this point should be clearly apprehended. The joint money income of the owners of fixed instruments is falling in the circumstances supposed, owing to two causes, (i) the fall in prices and (ii) the fall in the real productivity of the fixed instruments. Conversion can only reduce the money income of " fixed interests " in proportion to the fall in the real productivity of fixed instruments. There is no reduction in the income of " fixed interests " to correspond with the fall in prices. Consequently the share of the total investment income which goes to the " fixed interests " rises. Considerations, therefore, connected with conversion possibilities leave the conclusions of the foregoing paragraphs with their validity unimpaired.

It remains to examine the conditions which give rise to the secondary difficulty. (i) Quantity. If the quantity of labour and capital are increasing *pari passu*, the equilibrium real wage does not normally increase, and the secondary difficulty will arise under any system except that of stable prices. If capital is increasing in quantity more quickly than labour, there is some increase in the equilibrium real wage, and some fall of prices is consistent with avoidance of the secondary difficulty. The condition for avoiding it, however, with a constant money system and a stationary population is that the elasticity of substitution of capital should not be greater than one.

(ii) Power. The secondary difficulty can only be avoided with falling prices, if the increase of power raises the marginal productivity of labour. With a constant money system it can be avoided only if the productivity of labour rises as much as aggregate income, i.e. if the technological advance is not on balance of a " labour-saving " kind.

Summary. If the increase of income is due to an increase in the quantity of the factors, the primary difficulty can only be avoided by a system of stable prices and the secondary difficulty by one in which prices do not fall more than the marginal productivity of labour increases. If the increase of income is due to an increase in the power of the factors, to avoid the primary difficulty it is necessary that prices should not fall more than the productivity of fixed instruments increases, and to avoid the secondary difficulty it is necessary that prices should not fall more than the marginal productivity of labour increases. It appears that if both difficulties are to be avoided, there is only a narrow range of technological improvements, the increase of income due to which can be allowed to entail a corresponding fall in prices. Put otherwise, if both difficulties are to be avoided, the maximum rate at which prices can be allowed to fall is the rate at which the productivity of fixed instruments per unit is increasing or the rate at which the productivity of labour per unit is increasing, whichever is smaller. And if the primary difficulty is to be avoided the system of constant money is not allowable, if any net saving at all is occurring.

So far no difficulties connected with the stable price system have been considered. If this were really free of all difficulty, then surely it ought to be preferred, both for its simplicity and by reason of the doubts which must always be present in a real situation as to whether the conditions, under which falling prices will not give rise to the primary or secondary difficulties, are fulfilled.

There are two principal difficulties which, it has been suggested, may arise in connection with the stable price system. The first is concerned with the disturbance to sectional price levels caused by the infusion of new money. This difficulty, which is examined in Part II of this paper, I believe to be illusory. The second is concerned with the failure, on occasion, of rewards to factors of production to move upward in the manner which the preservation of equilibrium requires, and the consequent inflation of profit. This is really an inverse form of the secondary difficulty referred to above.

It should be observed at once that the inverse secondary difficulty is not such a weighty matter as the direct secondary difficulty. Both are due to a certain inertia in the economic system. In a régime of *laisser-faire*, trouble may arise because factors of production stubbornly resist downward revisions of their monetary payments, or because they are sluggish in pressing for those payments which the conditions of supply and demand enable them to obtain. To put the second alternative more strongly, we may write—because employers resist an upward revision of rates of payment to their employees. If now the community wishes for the equilibrium of regular advance to be maintained, it can urge, through the organs which give effect to its will, that employees should consent to a downward revision or that employers should consent to an upward revision, as the case may be. The chances of this persuasion being effective are clearly less in the former case than in the latter, especially when it is remembered that on occasions when an upward revision is urged, the higher level is consistent, by hypothesis, with the earning by employers of normal rates of profit on balance.

It may be thought that, besides an inverse secondary difficulty, an inverse primary difficulty might arise. This, if it were right to suppose that it would arise at all, would do so much less frequently than the inverse secondary difficulty, only, in fact, when technological improvements were making existing instruments of production more productive on balance. But in fact it will not arise at all. The disturbance which is thought to result from the inverse difficulty, arises because entrepreneurs are led to embark on projects, which can only be profitable while real rewards to factors are below the equilibrium level and may subsequently prove, if real rewards are restored, to have been ill-advised and wasteful. But the level of rewards to the " fixed interests " is an irrelevant consideration in the decision to embark on fresh projects. An abnormally low level of rewards to these, if it has an influence in this connection, will tend to check rather than to stimulate the formation of new *firms*, by rendering the existing firms more solvent. But this tendency is desirable, in accordance with a principle that has already been explained (p. 289 *sup.*). There is, consequently, no inverse primary difficulty.

The inverse secondary difficulty cannot occur under a system of stable prices when a departure from that system would give rise to the direct secondary difficulty. It only occurs when a fall of prices would not provoke the direct secondary difficulty. Now there are occasions when a fall would not provoke the secondary but would provoke the primary difficulty. Consequently it is possible to imagine situations in which a conflict occurs between secondary and primary considerations, when it is impossible to avoid the primary difficulty without incurring the inverse secondary difficulty and vice versa. What should be done then remains an open question. It must be borne in mind that it is possible to overcome the inverse secondary but impossible to overcome the primary difficulty within our existing economic structure. *Per contra* the magnitude of the inverse secondary difficulty which in practice occurs may be greater than that of the primary difficulty, and policy should be shaped accordingly.

Finally, it should be noted that the lag of real wages behind the advance of labour productivity should cause no trouble provided that the lag is constant.

From these considerations it appears that the ideal system in a community advancing in a normal and regular way might be consistent with some fall of prices, but not with keeping the quantity of money constant in the sense defined at the outset. It is unlikely that the fall of prices should be nearly as great as the increase of aggregate income, or as great as the increase of income per head.

II

It remains to consider the troubles which have been supposed to be due to the infusion by producers' credits of such new money as is required for the maintenance of the desired price policy. This infusion has been supposed to necessitate the depression of the market below the natural rate of interest with a consequent disturbance of sectional price levels.

In examining this contention it is only proper to analyse what occurs when a regular advance is under way. If irregularities and discontinuities occur, there will be sectional disturbances under *any* system. The correct mode of procedure is to determine what are the relative rates of increase of the various quantities in the system and ascertain whether these rates are mutually consistent. It appears probable that whatever system is most stable in the absence of discontinuities will absorb the shock of discontinuities with least subsequent disturbance.

Consider the case of a rising aggregate income and a stable price level. On the assumption of constant velocity the community will require to add to its monetary holdings, at the same rate that income is increasing. Suppose, to take the extreme case, that all money consists of banking obligations—notes and deposits—and that the assets held against these obligations consist exclusively of producers' credits. The rate at which credit must be expanded in order to maintain the system, is equal to the rate at which aggregate income is increasing.

The natural rate of interest is that which causes real capital to be increased at a rate equal to that at which the aggregate savings of the community increase. The savings of the community in any period may be defined as the difference between the value of its total income and the value of the consumable goods purchased therewith. It is required to determine whether the banking system will be obliged, in its effort to infuse new money, to depress the market rate of interest below this.

Let X be the total stock of money in existence at any time and x the new money that is to be injected in the succeeding unit period. $x/X =$ the rate at which aggregate income is increasing. The community may be divided into two sections, the business section and the income receivers. The business section sells consumable goods and securities to income receivers and buys the services of income receivers as factors of production; members of the business section also buy and sell goods from and to each other. The income receivers sell their services as factors of production to the business section and buy goods and securities from it. Individual members of the community may belong to both sections in their respective capacities of entrepreneurs and income receivers.

The distribution of the stock of money between the two classes may be constant or changing. In either case we may suppose that qx is the increment in a given unit period that the business section requires and $(1 - q)x$ consequently the increment that income receivers require in the same unit period. q may be zero, in the case in which all members of the business section are overdrawn.

In the unit period income receivers pay to the business community $(1 - q)x$ less units of money by the purchase of goods and securities than they receive from it as factors. Consequently, unless it is replenished from some other source, the monetary holding of the business section will run down by $(1 - q)x$. But the business section wishes to increase it by qx. If it is to do this, it will have to receive money from some other source equal to $(1 - q)x + qx = x$. And this is equal to the amount of new money injected by the banking system. It need not be supposed that any of the individual borrowers from the banks use any portion of the borrowed money to add to their monetary holdings; it suffices for the preservation of a mutually consistent system that some members of the section should add to their monetary holdings, and this they will do, unless $q = 0$. But, if $q = 0$, the *whole* increment of money x will be required by the business section to make good the excess of disbursements to income receivers over receipts from them.

Let the amount of saving in the unit period be s. Income receivers disburse in the purchase of securities $s - (1 - q)x$ in the unit period. If the business community wishes to increase its holding of real capital by s it must pay out to income receivers (including interest receivers) s units more than it receives from them by the sale of consumable goods. It therefore needs to "raise" s units by the sale of securities. But it needs to raise more than this. For its capital assets consist not only of real capital but also of such monetary stocks as it needs to hold. Therefore, if it is to increase its holding of real capital by s units, it must "raise" by the sale of securities not only s units but $s + qx$ units. But from the sale of securities to income receivers it will only get $s - (1 - q)x$ units. Therefore it must "raise" x units in addition to what it gets from this source. And this is what it gets by the additional credits (x) granted by the banks. If the banking system keeps its rates at such a level that the business community borrows x units from it, it will enable the business community to increase its real capital by s units, which is precisely equal to the difference between the income receivers' income and their expenditure on consumable goods. Therefore if the banking system keeps its rates at such a level that the business community is led to secure x units of additional loans from it, it is maintaining rates at their natural level. The whole system is perfectly self-consistent.

The belief that disturbances of the sectional price level will follow on the infusion of new money appears to be due to the omission in this system of national book-keeping of an important cross-entry, viz. the addition to their monetary stocks that both sections or at least one section of the community will require to make. It need hardly be observed that if the velocity of circulation was rising at the same rate as national income, this cross-entry would not be required, but then the further consequence would also follow that no additional loans would be necessary for the maintenance of a stable price level.

It may have been observed that in computing the addition to the real capital of the community, which it is required to equate to savings, the increase of monetary stocks was excluded. And this was perfectly correct. The increase of mutual indebtedness which a rising aggregate of outstanding bank credit implies is not an addition to the real capital of the community. Far different would be the case in which the medium of exchange consisted of gold. In this case the addition to the monetary stock would have to be reckoned in as part of the addition to real capital, and the natural rate of interest would be that which equated the saving of the community to the increase of other forms of real capital plus the increase in its monetary holding. It may be well to trace out what happens in this case.

Suppose that the new supplies of gold (x) accrue to the business community either by foreign exchange arbitrage operations or gold-mining. On the monetary side in any unit period it receives from income receivers $(1 - q)x$ less units than it pays to them; and it requires to add to its own gold holdings by qx units. The new supplies of gold (x) are disposed of in this way. On the capital side, it can sell securities to income receivers worth $s - (1 - q)x$; and of this sum it has to use qx to build up its own monetary holdings; consequently, since it receives no loans from the banking system, only $s - x$ is available for additions to its real capital other than gold.

If an intermediate system is employed, in which the banks hold a fixed proportion of their assets in the form of gold and only banking obligations are used by the community as money, then the natural rate of interest is the one which equates the increase of real capital excluding gold to the savings of the community, as defined above, minus the addition to the banks' stock of gold. Thus with a given rate of saving, the addition to the aids to production consistent with equilibrium is diminished more, the more that gold stocks are increased. The increment of prosperity that may be obtained by dispensing with a gold backing has been explained long ago by Ricardo.

If these arguments are correct, it follows that new money can be injected by producers' credits at a steady rate without producing sectional price disturbances, and that we are free to choose whatever price policy the considerations of the first part of this paper indicate as best.

Bricks—A Trade Index, 1785-1849

By H. A. Shannon

Where there are taxes, there are statistics. A specific excise duty was levied on bricks from 1784 to 1850, and as a consequence we have particulars relating to them for an unbroken period of sixty-five years. The parliamentary papers contain the annual yields of the duty which can easily be converted into a fairly accurate index of production, and the manuscript records in the Custom House contain quite correct figures. Both sources will be used, the former for certain local indices and the latter for a general index, and from them we can construct the index of brick production (and so *building*) for the period 1785-1849. Further, a brick-kiln cannot be hidden; the duty was light and the penalties were heavy; the initial assessment was made while the brick was barely advanced from clay and the charge levied within a few weeks. Unlike other excise duties, evasion was here wellnigh impossible. The figures, therefore, are very accurate.[1]

This series bridges the whole period of the Industrial Revolution—from the setting up of the first steam spinning-mill in 1785 to the full beginning of the railway age in the late 1840's. It has a double importance: a direct measure of building in general and an index of trade activity, especially for the capitalistic aspect of production and investment. Again, the blue-books give from 1829 to 1849 the duty received at each of some fifty local collection centres and from these particulars the various regional developments and activity can be located. "London" and "the country" can be separated, in the manuscript sources, from 1817.

I

The financial year and consequently the time-unit, in both sources, ends on July 5th down to 1816 and from then onward ends on January 5th, i.e. calendar year and fiscal coincide. As it is desirable in itself to break the series at the close of the Napoleonic Wars, no adjustment to calendar years will, for certain purposes, be made for the earlier period. And for other purposes, an adjustment has been made by taking half of one year and adding it on to half of the succeeding year, which slightly " smooths " the figures.

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[1] I am indebted to the Commissioners of Customs and Excise for access to the records, and to Mr. B. R. Leftwich, their Librarian, for much courtesy while working on the books. On the duties generally, see the *Eighteenth Report of the Commissioners for Excise Inquiry* (B.P.P., 1836, Vol. XXVI).

Down to 1802, no divisions were made in the category of " bricks," but at various dates from then onward the divisions of " common," " large " and " polished " were introduced with special rates of duty, and were reduced to " common " and " large " in 1840. Two other divisions of " extra polished " and " extra-large polished " were introduced in 1804, but these were much more nearly "tiles" than bricks, and they were, in the records, sometimes treated as tiles and sometimes as bricks. As their quantity is insignificant they have been ignored here.

The recorded production of bricks, expressed in millions, for England and Wales is given below in Table A as obtained from the manuscript records to 1840 and thereafter from Porter's *Progress*, the records not being extant after 1840. The results are shown graphically in Fig. 1 below, plotted to the logarithmic scale—the only adequate form of presenting an historical series like the present, as it keeps true proportions everywhere.

II

In general terms, the index for the years ending July shows a very rapid rate of growth in bricks and, inferentially, in building from 1785 to 1793—seven years of good trade, broken only once in the year 1788-9. From 1793 it shows a sharp fall to 1799—six years of bad trade, broken once in 1795-6. Then it rises with almost equal sharpness to 1803, and for most of the remaining war years fluctuates round an unusually stable high level, but, a few years before peace, drops again and continues its fall in the early peace years. For the approximate calendar years, the index follows the same course but smooths out the sharper peaks and valleys. Now exactly representing calendar years, it rises from 1816 to a promising boom for 1819, slacks off into a short slump, and from 1822 it rises to the great and dominating peak round 1825. Then the " morning after " follows and the index shows the inevitable stagnation of the early 'thirties and climbs

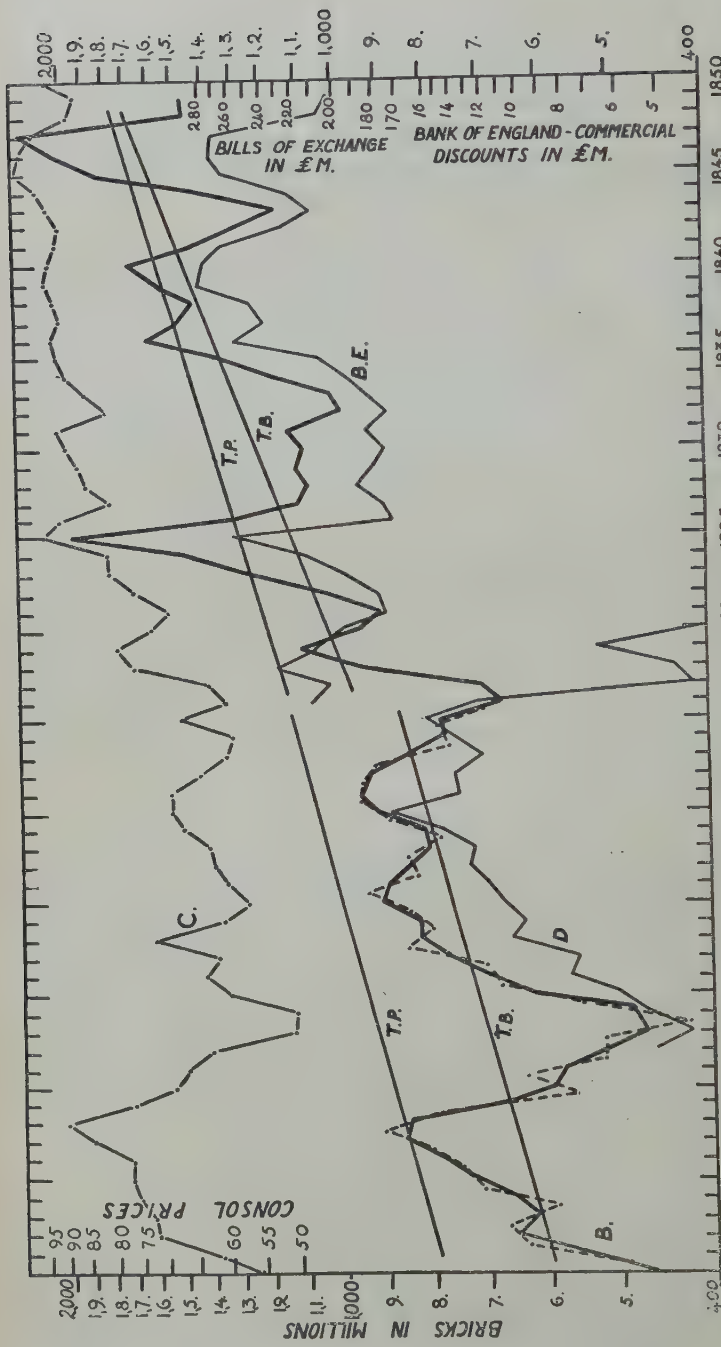

Fig. 1. *B* = Production of Bricks (in millions) in calendar years (estimated 1785-1815); July-July years, dotted line; *C* = Consol Prices with time lag; *D* = Bank of England Commercial Discounts; *B.E.* = Bills of Exchange created; *T.P.* = Population Trend; *T.B.* = Brick Production Trend. (Bricks side-scale divided by 100 = population scale.) All, logarithmic plating.

to recovery in the twin peaks of 1836 and 1839-40. The early 'forties saw the usual relapse, to be ended with the great railway years. As the index starts with prosperity, so it ends in depression.

The turning-points are all familiar dates and what little need be said about them is given below. The general description from the early figures, it may be remarked, receives full confirmation from Mrs. Dorothy George's specific evidence for parts of London. And, in turn, the figures suggest that her conclusions may be generalised. She tells us:

> " Each war is said to have checked building operations in London; builders' labourers joined the army or navy and materials became dearer, while peace brought a renewed outburst of building. After the (American) War, building went on apace . . . but with the outbreak of war in 1793 there was another check. . . . (By 1802) building had then been at a standstill about six years, but a new boom set in. The inflation of the currency raised prices and ' paltry erections ' which had been sold for £150 were let for thirty to forty guineas; ' hence every person who could obtain the means became builders . . . and every street was lengthened in its turn.' . . . The latter part of the great war reversed the tradition as to building in war-time and was a period of great building activity."[1]

The boom of 1825 requires no confirmation and we may accept, with confidence, the description of the *Annual Register* :

> " . . . on all sides new buildings were in the progress of erection; and money was so abundant that men of enterprise, though without capital, found no difficulty in commanding funds for any plausible undertaking."[2]

Tooke and the index agree in placing a building recovery late in 1833 when, he states:

> " New mills were in the course of being constructed but could not come into operation fast enough to meet the great and increasing demand for wrought goods."[3]

The long-drawn-out monetary derangements of 1836 to 1839 reflect themselves quite clearly in the twin peaks which illustrate the quick acceleration and deceleration of builders to fluctuating credit conditions. The persistence of considerable brick-making into 1840 probably arose from the *necessary* continuation of expenditure by the railways effectively promoted during 1836-7. The rise in the railway years, 1845-7 inclusive, needs no explanation. The abrupt fall, in face of railway requirements, during 1848 and 1849 does need one. Newmarch gives the annual expenditure in 1846 and 1847 as £37·8 and £40·7 millions respectively and in 1848 and 1849 as £33·2 and £29·6 millions. Despite his well-known argument on "the effects of the large railway outlay of 1846-50 upon the expenditure of the middle class," the fall-off is considerable. And, on the special point under consideration, Lardner says, referring to 1849, that on most of the more recently opened railways the stations were incomplete and in some cases depots and other permanent buildings had not been commenced.[1] Whatever the railways were spending on, they were not spending on bricks. Moreover, the sharp crisis of 1847 gave a much greater shock to confidence and credit than did the pressures of 1836-9.

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[1] Dorothy George, *London Life in the Eighteenth Century*, pp. 79-80.

[2] See Thomas Tooke, *History of Prices*, II, p. 153.

For the mill-building round Manchester, see Smith's evidence before the Bank Charter Committee, with its curious similarity to much of Prof. Hayek's trade cycle argument (*Report*, 1831-2, VI, especially the long Q. 4398).

[3] Tooke, *History*, II, p. 251.

Over the whole period, brick-making and consequently building show the spasmodic outbursts of activity and subsequent stagnation common to all constructional trades. This is seen clearly from the following table of average production[2]:

QUINQUENNIAL AVERAGE PRODUCTION OF BRICKS (IN MILLIONS), 1785-1849

(base 1785-9 = 100, with *inter-quinquennial* increases (+) or decreases (—) in percentages)

	1785-89	1790-94	1795-99	1800-04	1805-09	1810-14	1815-19	1820-24	1825-29	1830-34	1835-39	1840-44	1845-49
Bricks ...	568	793	530	711	846	887	841	1115	1318	1070	1486	1391	1749
Index ...	100	140	93	125	149	156	148	196	232	188	262	245	316
Increase ...	—	+40	—	+34	+19	+5	—	+33	+18	—	+39	—	+29
Decrease ...	—	—	−33	—	—	—	−5	—	—	−19	—	−6	—

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[1] William Newmarch in Tooke's *History*, V, p. 352; and Dionysius Lardner, *Railway Economy*, p. 58.

[2] In this table, allowance has been made for the fact that the first quinquennium was only fifty-eight months and for an adjustment of the fiscal year 1815 to the calendar year 1815. The adjustment is very close, being in part based on the manuscripts.

And in the next table, fiscal years have been converted to calendar years where necessary in the decennium 1810-19.

The index of average annual production in the quinquennia rises irregularly, with an actual fall in the early years of the Napoleonic Wars. The inter-quinquennial movement is different, for whereas the average annual production in 1790-4 was 40 per cent. higher than in 1785-9, it was 33 per cent. lower in 1795-9 than in 1790-4, and 34 per cent. higher in 1800-4 than in 1795-9; and so on. Again we see the sharp rise up to the war; the fall in the early war years; the recovery and a bulge of production when the paper standard was well established, and the slackening off as general and interest costs no doubt adjusted themselves; the slight post-war slump; the recovery in the 'twenties, greatly affected by 1825; the sharp fall in the early 'thirties, followed by great activity in the later 'thirties; and the slight check that ended in the railway boom.

But obviously with a commodity like brick and an activity like building, we should expect the averages if taken over a longer period than five years to show a positive growth instead of the above increments and decrements. That this is correct will be seen from the following table:

DECENNIAL AVERAGE PRODUCTION OF BRICKS (IN MILLIONS), 1790-1849

(base 1790-9 = 100, with *inter-decennial* increases in percentages)

	1790-9	1800-9	1810-19	1820-9	1830-9	1840-9
Bricks ...	661	779	859	1217	1278	1593
Index ...	100	118	131	184	193	241
Increase ...	—	18	11	40	5	25

Fluctuations, though positive, still appear; and not even the ten-year averages conceal the spasmodic growth in bricks and building.

III

In addition to these figures for England, we have local figures for some fifty centres 1829-49 inclusive. Their movements defy easy summary. And when the figures are plotted, although the movements in some centres show family resemblances there are but few twins. The trade cycle influences affected the different centres very differently.

There are difficulties too in interpretation. No manuscript sources now exist for the local collections and the particulars must be gathered from the blue-books.[1] The area corresponding to each centre is unknown but as bricks are not likely to have travelled far from their place of making, the centre where the duty was collected locates the production fairly closely. Unfortunately some centres were abolished and so affect neighbouring ones to an unknown degree: Wigan, suspended between 1832 and 1838 inclusive and abolished in 1846; Uxbridge, abolished in 1843; Wellington and Whitby, abolished in 1846; and a few *very* minor ones at other dates. Again, only the duty collected—not the bricks made—is given in the blue-books. But although the different types of bricks had different duties, "common" brick so greatly dominated the totals that the duty is a highly accurate index of the production.

The areas having as centres Lancaster, Manchester, Halifax, Sheffield and Leeds show very closely similar fluctuations, proportionately, in their brick production. The duty collected rises very sharply from about 1830 to a maximum in 1836, falls with checks to the lowest point in 1842 or 1843, again rises sharply to 1847, falls through 1848 and has a tendency to rise in 1849. In these five areas the brick production moved in a deep, distinct M-shape, as shown by the following indices of duty:

	1830	1832	1834	1836	1838	1840	1842	1844	1846	1848
Lancaster	100	179	284	598	373	308	104	340	604	305
Manchester	100	150	256	443	267	242	129	213	410	209
Halifax	100	152	210	352	308	102	54	75	385	218
Sheffield	100	91	75	151	144	106	78	64	111	163
Leeds	100	70	112	197	202	187	89	140	192	117

Despite the opening want of harmony in Leeds and Sheffield, the proportionate movements are very similar. There is no marked trend but simply a huge depression between the booms of 1836 and 1847.

Newcastle, Durham, York with—oddly—Hampshire and Oxford form a group with fair similarities, though, as might be expected, the first three are closest. They swing up, rather slowly and irregularly in the early 'thirties, to a maximum in

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[1] *Returns of Brick Duty*, especially in 1839, XLVI (329); 1846, XXV (82); 1847-8, XXXIX (168); 1849, XXX (218); and 1850, XXXIII (112).

The data and their log graphs are too voluminous for reproduction, but the indices in the text give a fair idea of the movements. For shortness they are given at two-yearly intervals, and it should be noted that almost everywhere the indices rise to a peak in 1847 though not here shown.

1840, passing by 1836 unheeded; then drop to their lowest in 1843; and rise at much the same rate to 1847, and again drop sharply but slightly. Whitby, before its abolition, also reached its highest point in 1840. For the northern areas this late maximum is undoubtedly due to the railway, completed to Newcastle by mid-1841. Unlike the first group, this one shows upward trends. The following are the indices of duty:

	1830	1832	1834	1836	1838	1840	1842	1844	1846	1848
Newcastle	100	96	117	126	172	256	145	142	289	243
Durham ...	100	107	90	89	109	202	90	90	221	210
York ...	100	76	87	99	110	168	99	96	222	174
Hampshire	100	86	99	105	84	167	78	116	188	174
Oxford ...	100	130	143	139	134	319	194	204	240	279

In the next separable group the main characteristic is a hump of high production in the late 'thirties, followed by a dip in the early 'forties and a sharp peak round 1847. For the areas round Stafford, Lichfield and Coventry, production slacks off from 1836 for a few years before dipping down; for Gloucester and Stourbridge, the slope of the hump is up from 1836 to about 1840. This fairly steady and high production in the Midlands is obviously related to the railway-building, of which Birmingham was the great junction. And Derby, it may be added, is a somewhat flattened version of the other Midland areas. Farther south the Salisbury area behaved in broadly the same way. The indices illustrate the detail:

	1830	1832	1834	1836	1838	1840	1842	1844	1846	1848
Stafford ...	100	135	139	194	161	158	118	121	187	224
Lichfield ...	100	102	103	160	147	134	110	77	124	138
Coventry	100	135	154	211	177	152	90	114	155	146
Gloucester	100	127	175	180	214	223	152	143	132	145
Stourbridge	100	94	120	195	210	246	136	117	209	252
Salisbury	100	113	121	181	145	135	101	120	165	132

Four areas passed through the 'thirties with hardly more than gentle ups and downs, with an uprush coming in the 'forties. On the east, Lynn rose steadily from 1842 to 1847, and Norwich also increased, though not so much, from 1843 to 1847. On the west, Bristol's brick production forms a shallow basin to 1844 and then rises sharply to 1847, and Dorset, on a much smaller scale, follows the same lines. For these areas the boom of 1836 did not exist. To say the same of Liverpool and Chester would be to simplify too much, for Liverpool has minor peaks round 1830 and 1836 and Chester in 1841. But they too are dominated by 1847 only. The relative stability of the 'thirties, as opposed to the eruption of the 'forties, can be seen from the table:

	1830	1832	1834	1836	1838	1840	1842	1844	1846	1848
Lynn ...	100	99	103	105	94	116	101	169	228	178
Norwich ...	100	80	79	79	83	90	87	89	133	130
Bristol ...	100	84	68	79	79	99	93	95	228	188
Dorset ...	100	81	103	101	103	108	93	99	108	133
Liverpool ...	100	71	56	90	70	68	75	124	192	45
Chester ...	100	80	86	104	100	170	145	201	241	80

Liverpool merits a special note for the early 'thirties. It was a storm centre for the builders in their Owenite days and the site of a great strike in the summer of 1833, when "not a brick was laid for sixteen weeks."[1] Here is the explanation of the very low figure for 1834. After the crisis of 1847 the precipitous drops in both Liverpool and Chester are very marked. Other areas with relatively uneventful 'thirties and brisk railway times in the 'forties are Lincoln and Suffolk.

Although the second group (Newcastle, etc.) shows upward trend over the period, sharper upward trend is found in the scattered areas of Wales (North and East), Hertford, Rochester and, not so rapid, in the Isle of Wight. These show upward wave-like movement, but in two other areas, Hull and Surrey, the period from the early 'thirties to the peak of 1847 was almost unbroken uprush. The indices give the particulars:

	1830	1832	1834	1836	1838	1840	1842	1844	1846	1848
Wales, North	100	92	96	124	143	171	124	116	212	185
Wales, East	100	86	100	148	174	227	177	204	284	282
Isle of Wight	100	102	114	157	111	157	152	177	217	152
Hertford ...	100	60	77	79	78	123	105	117	141	138
Rochester ...	100	79	92	138	138	195	173	221	333	191
Surrey ...	100	50	63	99	94	137	120	264	410	186
Hull ...	100	137	115	114	178	225	250	317	407	238

The long and fairly steady growth after the opening low levels is common to this group.

The remaining fifteen areas might better be catalogued than grouped. Cumberland, Northwich and Sussex—despite their geographical isolation—follow much the same lines in sharp peaks about 1835-6, 1840 and 1847 with U-shaped depressions between. Salop and Northampton are cousins, so to speak, of the third (Midland) group, but without their sustained production in the 'thirties. Cambridge moves sedately upward, but Hereford, Worcester and Exeter walk a drunken man's straight line. Bedford sweeps round from 1829 up to 1836 and from there down and up to three good years 1845-7.

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[1] See R. W. Postgate's *The Builders' History*, especially p. 88.

Grantham climbs steadily to 1841, falls off and rises to 1847. Reading's interval between the crises is broken ups and downs. Bath and Canterbury are peculiar, their graphs giving a pillar-like effect with the first having three years of exceptionally high production 1838-40 and the second two such years in 1842-3.

For the twenty-one years covered by the blue-book figures London and, in a small way, Essex show a drop to 1832, and then the curve of production exhibits first an increasing rate of growth and then a declining rate of expansion—a flattening curve, in short. For the earlier years from 1817, covered by the Excise records, London shows the same general movement as the all-England figures: a sharp rise to 1825, broken round 1819, and then a great drop to 1832. In 1825 duty was paid on just over 230 million bricks and in 1832 on just under 40 millions! The events of 1836-9 merely dent the long rise to 1842, when a distinct drop occurs before a new rise to 1847. The index is:

	1830	1832	1834	1836	1838	1840	1842	1844	1846	1848
London ...	100	60	81	103	105	138	136	132	173	100

If a general summing up of these local movements may be attempted, it would run as follows. Except for the first group of textile towns, bricks and building pass through the 'thirties relatively unmarked by the more purely industrial and financial troubles associated with 1836-9 but do in general show the railway-building of the late 'thirties. The early 'forties have low levels of production—" those dark years of hunger, Chartism and unemployment " is Professor Clapham's summary of the general conditions.[1] The railway boom of the 'forties, unlike the boom of the 'thirties, told everywhere in the country, brick production rising throughout the length and breadth of the land. So far as this industry is concerned, Tooke is vindicated in disallowing 1836-7 from " coming within the category of memorable commercial crises " and in controverting his opponents with an exclamation mark for 1839.[2]

Such is the general picture suggested by the facts of brick production. But the figures call for comment in two other directions—in population and in monetary matters, which are best treated separately.

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[1] J. H. Clapham, *An Economic History of Modern Britain*, I, p. 518.

[2] Tooke, *History of Prices*, IV, pp. 269-70.

IV

Behind the production of bricks lies the growth of population. A "normal" growth in the one may reasonably be postulated as a consequence of the other—but a growth distorted by trade-cycle influences and with distortions arising from the nature of constructional trades and the production of capital goods. The plot of the figures suggests at once a straight line trend of secular growth, which is also the type of population growth. It would be gratuitously daring to postulate an unbroken and steady rate of increase over so long a period as sixty-five years, with half of it complicated by a great war. Two sub-periods have been taken, 1786 to 1816, both inclusive and in July-July years, and 1817-49, both inclusive and in calendar years—one broadly of war, and one of peace. The trend lines are inserted in Fig. 1 above.

The trend equation for the first period, with origin in 1801, is

$$\log y = 2{\cdot}85546 + {\cdot}00514747x;$$

and for the second period, with origin in 1833, is

$$\log y = 3{\cdot}10748 + {\cdot}0077314x.$$

The change of rate, shown by the x-values, is obvious. The equations are equivalent to annual secular rates of increase of 1·192 and 1·796 per cent. respectively. The difference is important.

There remain the population trends. Estimates of the population during the eighteenth century cannot be pressed too far, but we can reach figures which seem accurate enough for the present purpose. Farr estimated the population in 1781 at 7,574,000 and in 1791 at 8,256,000 inclusive of the army, etc., abroad. The (compound) annual increase gives 7,907,000 as the population in 1786, which agrees closely with other estimates. Again, Farr gives the census figures for 1811 and 1821 as 10,454,000 and 12,173,000 inclusive of the army, etc., abroad. The (compound) annual increase gives 11,280,000 as the population in 1816. The secular rate of increase in population, 1786-1816, is therefore 1·191 per cent. per annum. Farr also gives the population, exclusive of the army, etc., abroad, as 11,378,000 and 17,564,000 for

1817 and 1849. The secular rate of increase in population, 1817-49, is therefore 1·366 per cent. per annum.[1]

The trend of brick production, 1786-1816, is 1·192 and of population is 1·191. Despite ups and downs, houses to let and worse overcrowding, bricks tended to keep pace with population. Some may conclude that things might have been worse, that the economic forces did not do so badly over a third of a century, mostly of war. Others may regret that the increase in national wealth did not result in a better social showing, and that if farmers, landlords and some manufacturers added room to room, none were added for the common man in a third of a century.

The trend of brick production, 1817-49, is 1·796 and of population is 1·366. Bricks were increasing faster than population by about one-third. The incubus of war had been lifted and some possibilities of social betterment brought nearer, though the towns were as the Health of Towns Commission found them in the middle 'forties. The distinctly faster rate supports such statements as made by Tougan-Baranowsky and others that the real acceleration in the Industrial Revolution came in the second quarter of the nineteenth century. For industrial building must have gone ahead rapidly if the brick production and the housing conditions are to be reconciled.

Such generalisations receive no rebuff from the standard histories of building construction.[2] These suggest that no important change in the technique of building was effected at any time in the whole period. From this side no disturbing factor needs allowance. Nor was there any serious disproportionate growth of population in stone-using areas, such as Wales and the North. Since housing of the population forms the greatest demand for brick, if population and bricks merely keep pace, with technique stationary, it seems fair to conclude that then no improvement of moment is present. Improvement may have occurred in the post-war period, despite twinges of the voting public's conscience in the 'forties and its consequent vision, but part of the increased brick production must have been taken off by the disproportionate industrial demand.

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[1] Mr. G. Talbot Griffith (*Population Problems of the Age of Malthus*, p. 18) gives 7,826,000 for 1785. Farr's figures will be found in the *General Report*, Census of 1861, Tables IVa and 15.

[2] See C. F. Innocent, *English Building Construction*; S. O. Addy, *Evolution of the English House*; N. Lloyd, *History of English Brickwork*.

V

For the second special aspect of the figures—bricks as capital goods—calendar years must be used throughout. For the records show, as would be expected, that almost the total production of bricks took place in the summer months, more precisely in the quarters ending July 5th and October 10th. It follows that the fiscal years cut production in two, with the halves separated by an almost dead period of six months during which the economic forces may have changed direction. The reduction to calendar years by taking half of one fiscal year and adding it on to half of the succeeding fiscal year is obviously only approximate, but for the earlier period it will give more relevant and appropriate figures.

Building and, therefore, bricks may fairly be expected on general grounds to move in sympathy with the rate of interest. The reaction might be expected to be quick, for we must not postulate too much long foresight on the part of the numerous small speculative builders, whom some call jerry-builders. Professor Clapham's description may be largely accepted:

> "Their methods have remained the same until our own time—the land rented in hope, materials secured on credit, a mortgage raised on the half-built house before it is sold or leased, and not infrequent bankruptcy."[1]

The yield of consols is the best index of general interest conditions, especially for the earlier period. If this is taken, brick production will be seen to follow the rate of interest with a time lag of about a year. The correspondence is remarkably close, at least down to the middle of the 'thirties and even thereafter the changes of direction in movement are similar. The consol rate diverges from the brick production in 1802 and in 1814, but as one date is the Peace of Amiens and the other the first Treaty of Paris the explanation lies in the political field. It is noticeable, however, that the Hundred Days affected consols more adversely than Waterloo affected them favourably. And in the troubled days preceding the Reform Bill, the sharp fall in price and rise in yield tell in figures the panic of British aristocrats yearning for the safer protection of the American Constitution.[2]

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[1] J. H. Clapham, *An Economic History of Modern Britain*, I, p. 164.

[2] See especially T. Raikes's *Journal*, I, p. 50. Lord Hertford ("Steyne" in *Vanity Fair*) lost between £300,000-£400,000 by this piece of foresight—his American investments were repudiated. Also L. H. Jenks, *Migration of British Capital*, p. 80.

On the other hand, bricks diverge from consols between 1806 and 1809. But the high plateau-like level of production between 1802 and 1812 requires explanation first. Shortly, it may lie in a divergence of " market rate " of interest from " natural rate," making a capital production more profitable, if, following the Victorian physicists and their ether, we postulate a thing not directly observable to explain what is directly observable. And to give substance to the contention, there are also plotted the Bank of England's commercial discounts.

The Usury Laws placed a limit of 5 per cent. on interest charges, and for eighty years (1742-1822) the Bank of England maintained its rate of discount on inland bills at this level. It follows that where the market conditions set a lower rate, the Bank did little discounting business, but as market conditions hardened and the rate rose to 5 per cent., the Bank would do more business. But at the fixed rate of 5 per cent. discounting could not go on indefinitely if the convertibility of the notes and the " safety of the establishment " were to be assured, and rationing or open-market operations had to be resorted to. The Bank Restriction Act of 1797 changed all this and with inconvertible paper there was no limit to the amount of discounting except the Bank's routine standard of bills, its own foresight and a fear of the fate of the assignats falling on the notes. But if profits on a capital production are abnormally high, and rents were rapidly rising, as Mrs. George's evidence shows, and the rate for borrowing is fixed at a relatively low level, then obviously it pays to borrow and capital production is given an " unnatural " impetus. The bulge of brick production is what might be expected from such causes. With the Bullion Report on the one hand, despite its *officially* disclaimed truth by the Bank, and with something like a saturation point and a fear of overdoing building, the high volume of discounting falls off from 1810 and brick production from 1812.

But timber is also necessary for building, and a serious check there might be expected to react on brick-making. The main sources for timber were the Baltic, Russia and America, and were all affected through political measures. Napoleon's Continental System (1806-7) and the Treaty of Tilsit (1807) cut deeply into the European timber supply until Bernadotte and the Czar became restive from 1810. America's Embargo Act in 1808 and the War of 1812-14 affected the American supplies, despite the transport of timber via Canada in the former year. Here is the cause for the divergence of bricks from consols in 1806-9. The fall-off in imports is shown quite clearly by the drop in the *official* values, which measure quantity:

OFFICIAL VALUES OF TIMBER IMPORTS, IN £000'S

	1805	1806	1807	1808	1809	1810
Europe:						
Balks ...	20	27	19	1	4	22
Deals ...	89	86	68	21	51	93
Fir	178	105	156	19	40	102
Oak Planks	39	25	15	1	1	8
Staves ...	25	12	13	5	28	32
America:						
Deals ...	2	3	4	4	5	7
Fir ...	13	17	37	43	71	100
Oak Planks	8	10	13	14	11	29
Staves ...	54	72	73	25	64	69
Totals ...	428	357	398	133	275	462

Despite Canada's effort to exploit her preference, the shortage was marked in 1806-9. Under the double influence of scarcity and high freight charges, prices jumped, as Jevons's timber index shows[1]:

1805	1806	1807	1808	1809	1810	1811	1812	1813
146	136	168	253	533	300	381	306	185

There seems to have been the makings of another bulge in the late 'thirties, say 1835-40. Despite the special railway influences and some very tangled skeins in international finance and conditions, it is tempting—if controversial—to suggest a modified repetition of 1802-12. At the renewal of the charter in 1833, the Bank suffered a cut in profit of some 10 per cent. from the reduction of £120,000 in the Government's payment and at the same time had to meet, in some connections, the increasing competition of the new joint-stock banks. In 1838 the petty economy was attempted of reissuing notes. It seems certain that the Bank's profitableness was reduced and that the directors might be tempted into unwise paths. For 1839 Tooke, a perennial critic no doubt, sounds a new note: the Bank was sacrificing the public's interests to the proprietors'.[2] Round 1835 the Bank had large "special" deposits from the Savings Banks, the East India Company, which was paid interest—the first time in the Bank's history for this to be done—and the West Indian Loan. Some re-lending of these special deposits might well have been allowed and the resulting profit fairly earned. But it is tempting to suggest that, relatively to the international situation and especially in America, the re-lending was overdone; that too much rope was given to the bill-brokers and *through them*, ironically, to the joint-stock banks by discounting and otherwise; and that consequently the money market was made " unnaturally " easy, with an ensuing bulge in the production of capital goods, here bricks.

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[1] *Investigations* (ed. 1909), pp. 134 and 138.

[2] Tooke, *History of Prices*, III, p. 101.

For the peaks of 1825 and of 1845-7, the interest movement must be regarded as natural. The long-term rate had been falling to the early 'twenties, both in England and in France, as the debt conversions in each country prove clearly. And in England some £9,000,000 of free capital was added to the market by the paying-off of dissentients. In the early 'forties the high price of consols shows the low interest rate. The short-term rates were unprecedentedly low, for Gurney's market rate shows that out of twenty-eight consecutive months in 1842-4 his rate was 2½ per cent. or lower in twenty-five of them, whereas in the previous twenty years there had been only eleven such months.

The relation between the movements in brick production and in the short-term rate is still more remarkable. A low rate in itself conveys little significance, for, according to its place in the trade cycle, it may more directly signal either the coming or the departure of a boom. It may mean that " capital is on strike." The volume of business done at a rate is a better index. Here the volume of inland bills of exchange for England has been calculated for 1816-29 and taken from Newmarch for 1830-50. The very close correspondence between them and brick production heightens the general significance of the latter as an index of trade activity throughout its own length.

VI

In 1850 the duties on bricks were repealed and the valuable series ends. Production rose in the middle 'fifties to the boom of 1857. Tooke, a convinced free-trader, here forgot the upswing of the trade cycle and remembered only the repeal of the duties.[1] From 1860 the unemployment percentages in some builders' unions are available.[2] And thus, in various ways, a fairly accurate picture can be formed of the fluctuations in the building industry for almost a century and a half.

TABLE A

BRICKS PRODUCED, CONSOLS, BANK COMMERCIAL DISCOUNTS, BILLS OF EXCHANGE CREATED

Bricks, in millions				Consols			Discounts		Bills	
Year to July 5	Bricks	C'ndar Year	Bricks	Year	Price	Y'ld	Year	£m.	Year	£m.
1785	358·8	1785	463·1	1784	55·4	5·5				
86	495·7	86	565·6	85	60·9	4·9				
87	635·8	87	651·9	86	72·1	4·2				
88	668·2	88	629·2	87	72·6	4·1				
89	590·3	89	650·7	88	74·8	4·0				
90	711·2	90	730·5	89	76·3	3·9				
91	749·9	91	778·9	90	76·9	3·9				
92	808·0	92	858·4	91	83·7	3·6				
93	908·9	93	848·2	92	90·0	3·3				
94	787·7	94	673·4	93	75·7	3·9				
95	559·3	95	596·1	94	68·2	4·4	1795	2·95		
96	633·0	96	575·3	95	66·4	4·5	96	3·45		
97	517·7	97	517·2	96	62·5	4·8	97	5·32		
98	516·8	98	469·0	97	50·8	5·9	98	4·37		
99	421·3	99	482·1	98	50·5	5·9	99	5·50		
1800	543·1	1800	608·8	99	59·2	5·1	1800	6·32		
01	674·7	01	686·6	1800	63·6	4·7	01	7·97		
02	698·6	02	770·3	01	60·9	4·9	02	7·55		
03	842·1	03	818·8	02	70·9	4·2	03	10·80		
04	795·7	04	820·6	03	60·2	5·0	04	9·85		
05	845·5	05	889·4	04	56·6	5·3	05	11·27		
06	933·2	06	882·2	05	59·3	5·1	06	12·10		
07	831·3	07	836·4	06	61·5	4·9	07	13·25		
08	841·6	08	810·4	07	62·7	4·8	08	12·92		
09	779·3	09	826·8	08	66·4	4·5	09	15·32		
10	874·4	10	912·5	09	68·3	4·4	10	19·50		
11	950·6	11	945·1	10	68·4	4·4	11	13·70		
12	939·6	12	925·8	11	64·2	4·7	12	14·00		
13	912·0	13	835·1	12	59·7	5·0	13	12·25		
14	758·1	14	768·3	13	58·8	5·1	14	14·02		
15	778·4	15	778·0	14	66·7	4·5	15	16·15		
		16	673·0	15	59·9	5·0	16	12·30	1816	213

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[1] *History of Prices*, IV, p. 456—with an important reference to machinery in brick-making.

[2] Cp. G. T. Jones's data (*Increasing Returns*).

TABLE A—*continued*

Bricks, in millions				Consols			Discounts		Bills	
Year to July 5	Bricks	C'ndar Year	Bricks	Year	Price	Y'ld	Year	£m.	Year	£m.
		1817	701·7	1816	62·1	4·8	1817	4·30	1817	204
		18	952·1	17	75·3	4·0	18	4·60	18	235
		19	1101·6	18	78·2	3·8	19	6·92	19	210
		20	949·2	19	70·9	4·2	20	4·15	20	199
		21	899·2	20	68·5	4·4			21	176
		22	1019·5	21	74·5	4·0			22	181
		23	1244·7	22	79·3	3·8			23	196
		24	1463·2	23	79·5	3·8			24	215
		25	1948·8	24	93·8	3·2			25	262
		26	1350·2	25	89·7	3·3			26	173
		27	1103·3	26	79·6	3·8			27	177
		28	1078·8	27	84·1	3·6			28	189
		29	1109·6	28	85·7	3·5			29	185
		30	1091·3	29	88·8	3·4			30	177
		31	1125·4	30	89·7	3·4			31	186
		32	971·9	31	79·8	3·8			32	173
		33	1011·3	32	83·7	3·6			33	185
		34	1152·4	33	87·8	3·4			34	192
		35	1349·3	34	90·3	3·3			35	210
		36	1606·1	35	91·0	3·3			36	259
		37	1478·2	36	89·4	3·4			37	238
		38	1427·0	37	90·9	3·3			38	245
		39	1568·7	38	92·9	3·2			39	282
		40	1677·8	39	91·5	3·3			40	278
		41	1423·8	40	90·3	3·3			41	265
		42	1271·9	41	89·4	3·4			42	228
		43	1158·9	42	92·0	3·3			43	210
		44	1420·7	43	95·3	3·2			44	226
		45	1820·7	44	99·4	3·0			45	263
		46	2039·7	45	98·6	3·0			46	274
		47	2193·8	46	95·8	3·1			47	273
		48	1461·0	47	87·3	3·4			48	205
		49	1462·7	48	85·5	3·5			49	202

NOTES TO TABLE

1. Bricks.—Calendar years 1785-1815 estimated as given in text, other figures original items. Sources: The manuscript records in the Custom House to 1840, 1841-9 from G. R. Porter, *Progress of the Nation* (ed. 1851), p. 538.

2. Consols.—For 1784-9, calculated from Sir John Sinclair, *History of the Revenue* (1802), II, App. pp. 41-3; for 1790-1830, after N. J. Silberling, *British Financial Experience, 1790-1820* (in *Harvard Review of Economic Statistics*, 1919, I, p. 289); for 1831-48, after A. H. Gibson, *Future Course of High Class Investment Values* (in *Bankers' Magazine*, 1923, CXV, p. 32). My own and Silberling's are based on monthly averages, Gibson's to 1839 on highest and lowest in year, from 1840 on daily averages. Gibson and Silberling differ 1820-30, sometimes in a serious degree (e.g. 1825 as 84·6 and as 89·7), so that re-calculation might affect "the Paradox" for the early years.

Note the arrangement of years in the table.

3. Average Commercial Paper under Discount at the Bank of England.—After Silberling, *British Prices and Business Cycles, 1779-1850* (*ibid.*, 1923, V, p. 256). By reason of definition, the figures are not quite the same as given in Appendix 59 of the Bank Charter Report of 1832 (1831-2, VI).

4. Bills of Exchange Created.—For 1816-29, calculated from the data in *Stamp Returns*, 1828, XVI (94, 558) and 1830, XXV (160), assuming the highly abnormal figure of 31,670 15s. stamps for calendar year 1820 to be a misprint for 11,670 and using Newmarch's conversion factors (Table III, p. 150 of *Statistical Journal*, 1851, XIV); for 1830-50, after Newmarch (*History of Prices*, VI, p. 589 ff.), with Silberling's correction for 1841 verified and accepted.

The bills considered are only Newmarch's Classes II and III (medium and large). Class I (small) is negligible and irrelevant.

The Diagrammatical Representation of Demand Conditions in International Trade

By A. P. Lerner

In a previous article,[1] concentrating on cost conditions, I avoided the complications on the side of demand, representing these by what I loosely called "consumption indifference curves." I made it clear in a footnote[2] that these, being applied to "countries" and not to individuals, are not the ordinary curves which show combinations of commodities to which an individual is indifferent; but the legitimacy of the procedure still remains to be vindicated.

I

1. The objection is that one cannot say that a community is definitely better or worse off in one of two positions if some of the individuals in the community are better off and others are worse off, so that one cannot draw indifference curves for a community. The same objection might be raised in the case of an individual. If a man has more food but less fuel, how are we to balance the quite different feelings of satiation and cold that he experiences and say which is the greater? The answer is a behaviourist instruction to observe the results of the action which takes place when the various forces have worked themselves out and the individual makes a decision. The same procedure might be adopted in the case of the community. It, too, can just as tautologically be said to prefer that which is acquired by the community to that which might have been acquired in its stead. It is true that the decisions of the community depend upon the distribution of property among the individuals of the community and on their consequent differential pull, but it is no less true that the decision of the individual depends upon the relative pull of his different

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[1] "The Diagrammatical Representation of Cost Conditions in International Trade," Economica, August 1932.

[2] *Ibid.*, p. 347.

appetites. In both cases these pulls have to be taken as given, and the greater readiness to accept them in the latter case seems to be nothing more than individualist prejudice.

2. Of greater validity is the objection that the distribution between individuals in a community itself depends upon what is being produced, so that the production and consumption indifference curves cannot be drawn separately and then applied to each other. This independence is not assured in the case of the individual either, for it is quite likely that the kind of work done influences the individual's tastes. But these objections are covered by a more serious one which applies to individual indifference curves as well as to " collective indifference curves " (or curves which show by their slope at any point the relative prices of the commodities or the rate at which they are exchanged when available in the quantities indicated by the co-ordinates of the point). These curves cannot be considered as known over the whole surface or even over any considerable area, but only at or near the point where the individual or community happens to be. In the case of the individual it is because it is only in this vicinity that he has learnt by experience the effects of small changes, and also because changes in what he produces may affect his tastes. In the case of the community it is because the price ratio will depend not only on the quantities of the commodities available, but also on what the people are engaged in producing as well as on the relative wealth of the individuals in the community.

3. The result is that both for the individual and for the community we must use not continuous indifference curves, but only the knowledge of marginal rates of substitution or relative prices (represented by slopes which may be considered as tangents to consumption indifference curves) at points on the production indifference curve or the line of exchange which can actually be reached.[1] The individual or community will then move along these paths until a point is reached where the slope is tangential to the path and equilibrium is attained. Multiple equilibrium is of course possible in both cases.

This type of reasoning can be substituted wherever in my previous article I have applied " collective indifference curves " to countries or combinations of countries, without affecting the arguments there put forward.

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[1] These slopes need not, of course, be considered as part of one system of consumption indifference curves as the system may be considered as changing in shape as one moves along the path.

II

4. The construction given above seems the simplest for dealing with the problem raised by the troublesome " consumption indifference curve " of my previous article, but another approach to the problem has led to what appear to me to be much more interesting constructions.

Consider an individual's indifference curves. Following the usual assumptions of diminishing utility we find his consumption indifference curve sloping down from left to right and convex to the origin. If we follow up this curve towards the right we see it getting flatter and flatter until a point is reached where it is horizontal. At this point the marginal utility of commodity X has fallen to zero since a small increase in the quantity of X without any change in the quantity of Y leaves us on the same curve. If it reaches the X axis and disappears before becoming horizontal we have to take a higher curve, and we will finally get one which becomes horizontal (unless the desire for the commodity is insatiable). It may continue horizontal for some time and will do so as long as additional quantities of X are indifferent to the individual, but after a time additional X becomes obnoxious and our individual will only be indifferent to an addition of the discommodity X if it is made up for by an *addition* of some of commodity Y. The curve will turn upwards. With the increasing degree of discommodity of X and diminishing utility of Y, he will require larger and larger quantities of Y to make up for each additional unit of X that he has to suffer. The curve will become steeper in its upward turn until it becomes vertical. This happens when the marginal utility of Y has fallen to zero, and our individual cannot be compensated for additional quantities of X by any additions of Y. The curve continues upwards vertically as long as additional quantities of Y are indifferent, but when Y too becomes obnoxious and a discommodity, our individual has to be compensated in some way if an addition of some of the discommodity Y is to leave him in an indifferent position. Giving him more X will not compensate him, for X is here also a discommodity, but he can be compensated for suffering more Y *by being made to suffer less* X. This means that the curve will turn back, going upwards to the left. The increasing disutilities of the discommodities will make the curve turn more and more to the left, making it concave downwards.

The same, of course, holds if we follow up the consumption

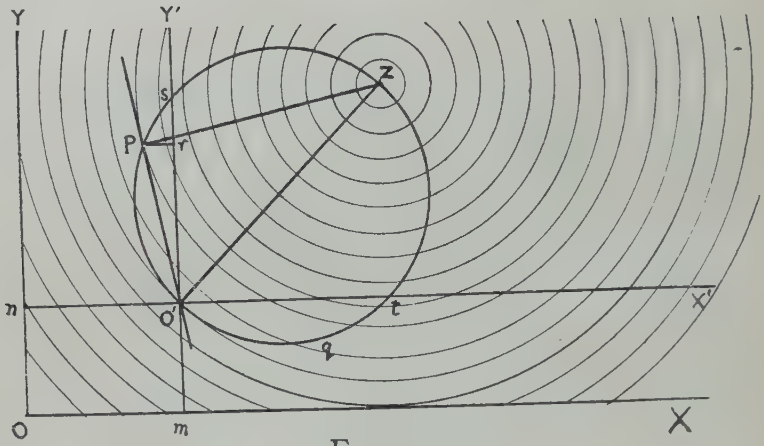

FIG. 1

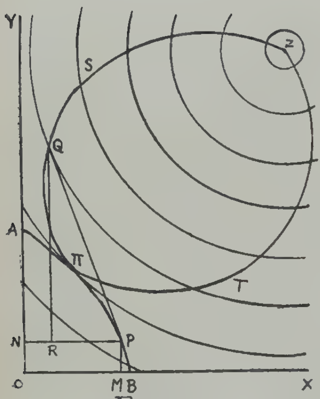

FIG. 2

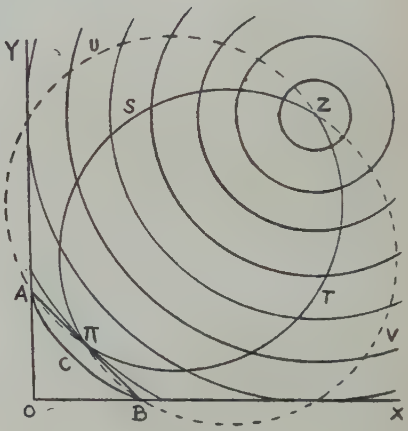

FIG. 3

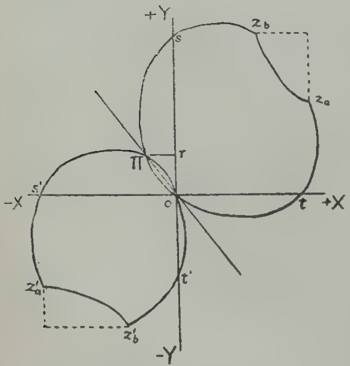

FIG. 4

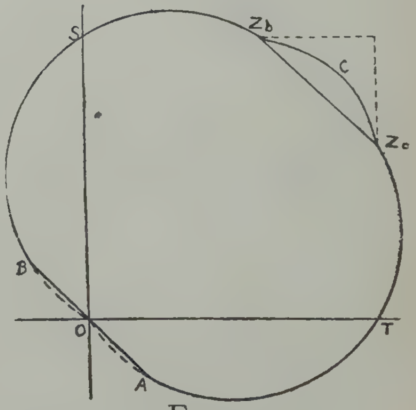

FIG. 5

indifference curve in the other direction. As we follow it from the initial position to the left it becomes steeper and steeper until it is vertical. It then turns round to the right, becomes concave downwards, becomes horizontal, and then turns down to the right, still concave downwards, where it meets the other end of the curve where we left it at the end of the last paragraph. The curve is thus shown to form a circuit which in our diagram we can draw as a circle. A higher one will form a circle contained within this circle showing the consumption or possession of larger quantities of X and Y in the regions where they are scarce commodities, and smaller quantities in the regions where they are superabundant nuisances. A lower one will form a larger enveloping circle showing smaller quantities of commodities and larger quantities of nuisances. We thus get a series of concentric circles covering the whole of the area between the axes. The higher curves are smaller circles within circles. The highest converges to a point which shows that combination of X and Y where they are neither commodities nor discommodities, but both have a marginal utility of zero. They are neither scarce nor superabundant. There is just the right quantity, and any addition to or subtraction from that quantity of either would diminish our individual's well-being. Such a series of concentric consumption indifference curves are shown in Fig. 1 with Z the point of " Bliss " marking the centre of the system.

5. From any point O′ which marks the quantities of the commodities (Om of X, On of Y) that an individual possesses, we can draw a curve which will show us how much trade the individual will do at any market price and in what direction he will trade, i.e. whether he will trade X for Y or Y for X. This curve is the locus of all points from which tangents to the consumption indifference curves pass through O′. With circular indifference curves with centre Z this will give us the circle having the diameter O′Z, since at any point P on the willingness-to-trade or demand curve the tangent PO′ is at right angles to the radius ZP and the locus of the apexes of right-angled triangles on the same hypotenuse is a circle. If the line of exchange is represented by the slope of O′P the individual will move along it to P where the slope of the indifference curve or his subjective scale of preference is identical with the market rate of exchange or the objective scale of preference, giving up Pr of X for O′r of Y (Pr perpendicular to O′Y′). Remembering that circles are here used as ideal types

for any kind of circuit, we may say that all demand curves are circular.

6. It should be observed that the sections of the demand curve O′Ps and O′qt are the familiar Marshallian willingness-to-trade curves.[1] If we take O′ as our origin and O′X′ and O′Y′ as our axes, there will then be measured not the quantities of X and Y consumed or possessed by the individual, but only quantities that he gives and receives in exchange. If the rate of exchange is that indicated by the tangent to the demand curve at O′ (which is also the tangent to the indifference curve at O′) there will be no trade. Any other line of exchange through O′ cuts the demand curve at some other point which marks the quantity of trade done, the commodity acquired being measured positively and the commodity given up being measured negatively. Thus with the line of exchange O′P there is acquired the amount of Y measured positively along O′r and there is given up the amount of X measured negatively along rP giving the total movement O′P. A normal price line will be negatively inclined as normally some of one commodity has to be given up to get some of the other. A vertical line of exchange would mean that Y can be obtained without changing the holding of X, i.e. it is a free good. Y would then be acquired until the point s is reached where its marginal utility is zero. A horizontal line of exchange would similarly lead to a free acquisition of O′t of X. A positively inclined line of exchange would mean that every acquisition of a quantity of one commodity has to be accompanied by a certain proportionate *increase* of the holding of the other good—a negative price. The most advantageous line of exchange would be O′Z which would allow of movement to the point of " Bliss " and is as good as having both goods acquirable and disposable without cost.[2]

7. A similar demand curve can be constructed for an

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[1] *Pure Theory of International Trade*, L.S.E. Reprints, and *Money Credit and Commerce*, Appendix J.

[2] All this probably looks like the remotest possible kind of pure abstraction, but this completion of an old line of thought has already proved of service in several real problems. It shows how Marshall's " normal case " of international trade supply-and-demand curve is merely the elastic part of the demand curve ; that if Marshall had followed up his curves he would have found that every " normal " curve became " abnormal," and that every " abnormal " curve begins by being " normal." It shows further that every demand curve starts off with an elasticity of infinity which ultimately falls, as price falls, to a zero elasticity. It demonstrates more clearly than any other treatment the fact that what a person or country will trade, what are export goods and what are import goods, depends upon these relative prices.

individual who instead of a stock of commodities as in Fig. 1 has the possibilities of production of a P.I.C.[1] as in Fig. 2. Here the demand curve is the locus of all points on the C.I.C.s from which points tangents to the C.I.C. are also tangential to the P.I.C. (or meet the P.I.C. at either of its extremities), and the C.I.C. and the P.I.C. are on opposite sides of the tangent. The tangency of the line of exchange to the P.I.C. represents the necessity of goods alternatively producible at the margin having the same value—otherwise there is a possibility for gain by transferring production from the one with the lesser value to the one with the greater value. Where the line of exchange touches an extremity of the P.I.C., the individual is specialising completely in one commodity, and there is no possibility of producing more of it by any sacrifice in the production of the other. If the rate of exchange is that indicated by the slope of PQ the individual will produce at P, i.e. OM of X and ON of Y, and will exchange PR of X for RQ of Y moving from P to Q, PQ being tangential to AB at P and to a C.I.C. at Q. It is necessary for the C.I.C. and the P.I.C. to be on opposite sides of the line of exchange, for if both are on the same side it will be possible to reach a higher C.I.C. by moving on a parallel line of exchange from an adjacent point on the P.I.C.

8. To get this demand curve it is not necessary to assume, as is assumed in Fig. 2, that costs are increasing. Fig. 3 shows the demand curve with constant or decreasing costs. Keeping in mind our assumption of a given market rate of exchange between the commodities, it is clear that with decreasing cost the individual will always specialise in either X or Y, since at any rate of exchange he can thus get more than if he produced some of each. Thus if ACB in Fig. 4 is his P.I.C. a straight line at any slope whatever from either A or B can bring him to a position at least as high as Π on his system of C.I.C.s If costs are constant the P.I.C. is the straight line AΠB. At the rate of exchange indicated by the slope of this line, Π will be the point of consumption, but production is indifferent anywhere along AΠB since Π can be reached by exchange from any point along the line. At any price other than this a position preferred to Π can be reached by specialising and producing at A or at B, and the demand curve is the locus of points on the C.I.C.s from which tangents can be drawn to A or B, keeping the P.I.C. and the C.I.C. on opposite sides of the tangent. The demand

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[1] P.I.C. stands for Production Indifference Curve and C.I.C. stands for Consumption Indifference Curve.

curve will be composed of sections of circles like the demand circle of Fig. 1 having AZ or BZ as diameter. These circles are ΠTZUA and ΠBVZS, and the demand curve is made up of the sections ΠTZ of the one and ΠSZ of the other, as only these sections have the C.I.C. and the P.I.C. on opposite sides of the tangent. In the case of constant costs we have to take into account the possibility of producing at other points on the P.I.C. and reaching Π by exchange, so that at the price indicated by the slope of AΠB there can be exchange up to BΠ of X for Y and up to AΠ of Y for X. This is not so for the case of decreasing costs. We can therefore say that for constant costs the demand curve is AΠTZSΠB, while for decreasing costs it is limited to the circuit ΠTZS.

9. This demand curve gives us the alternative and more interesting way of finding the equilibrium of trade between two "countries." The point where the demand curve touches the P.I.C. is the same point at which a C.I.C. touches it—Π in Figs. 2 and 3. So that instead of saying that an isolated individual with increasing or constant costs will produce at the point on his P.I.C. where a C.I.C. is tangential to it, we may say that he will produce at the point where it is touched or cut by the demand curve. The case of decreasing costs raises a special difficulty that will be dealt with below. The advantage of thus substituting the demand curve for the C.I.C. lies in the fact that while the C.I.C.s of two individuals cannot be added in any way, the demand curve *can* be added and applied to the compound P.I.C. thus giving us the production of the two individuals when they trade with one another. If we consider the P.I.C. AB in Fig. 2 to be the compound P.I.C. of two individuals obtained as described in my previous article, the compound curve ΠTZQ can be obtained as described below. We need three diagrams, one for each individual separately and one for the combination of the two. Since all these diagrams will look alike we can take Fig. 2 to stand for all of them, making clear to which we are referring in the text by following the notation of my last article and using lower-case letters for the first individual, lower-case letters dashed for the second individual, and capital letters for the compound case.

Having got the compound P.I.C. AB from ab and a′b′ take points p, p′, and P where parallel lines are tangential to the curves or touch their extremities, and draw these parallel lines. Mark off q and q′ where these lines cut or touch the demand curves πszt and π's′z′t′ respectively. On the tangent at P parallel to pq and p′q′, mark off Q so that PQ=pq+p′q′ in length and direction, so that where pq is drawn in the sense or direction opposite to p′q′, PQ will be equal in length to the difference between these two lines and will be in the sense of the longer line. Where pq is equal in length and opposite in sense to p′q′, PQ will be equal to zero, P and Q will coincide, and we will have the point where the compound demand curve touches the compound P.I.C.—that is Π in Fig. 2. The compound demand curve will be the locus of all points Q obtained in this manner from parallel lines of all possible slopes.[1]

At any price represented by the slope of the parallel lines pq, p′q′, and PQ, pq represents the amount and direction of trade the first individual is willing to do, and p′q′ the amount and direction of trade the second individual is willing to do. Unless pq and p′q′ are opposite in sense, unless, that is, one wishes to trade some X for some Y while the other wishes to trade Y for X there can be no trade between them. And unless pq is equal to p′q′ in length, the supply will not be equal to the demand and there will ensue a change in price. Trading equilibrium can therefore only be reached when pq is equal and opposite to p′q′ and that as we have seen is where PQ is equal to zero. The price in equilibrium will be that represented by the tangent to the compound P.I.C. where it is touched by the compound demand curve, i.e. by the tangent to AB at Π. At that price production must be as indicated by the ordinates of Π.

10. The relation of these individual demand curves to international trade becomes clear when it is observed that the compound demand curve can again be added in the same way to any other such demand curve whether primary or compound. The compound demand curve in conjunction with the compound P.I.C. shows in PQ the amount and direction of trade

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[1] In the compound case of Fig. 2 there will therefore be no C.I.C.s, but only price-slopes on the P.I.C. AB, and on the demand curve ΠSZT. At Π the price-slope would be the same as the slope of the P.I.C. and that of the demand curve. On all other points of the demand curve the price-slopes would be such that if continued they would form the lines of exchange tangential to the P.I.C. or touching its extremities. As one moved along the demand curve from Π to Z by either route, the price-slope, identical with the slope of the demand curve at Π, would cut it at a greater and greater angle (just as in moving from Π to A or B) until at Z it becomes perpendicular to the demand curve and disappears. A price-slope at any point on the P.I.C. would represent the knowledge of the price that would obtain for that combination of production if there is no trade with outsiders, i.e. outside the individuals included in this compound case. A price-slope at any point on the demand curve would show the price that would obtain if the point were reached by producing where the ratio of alternative marginal products is equal or nearest to the price and trading with outsiders.

that the individuals taken together are willing to do at each price. Where both are willing to trade in the same direction, PQ is the simple arithmetical sum of pq and p′q′; but where one wishes to do some trade with the other individual the amount of trade that the two individuals taken together are willing to do with outsiders is less than the amount of trade that one of the individuals would be willing to do by himself, the limiting case being that just described when the two individuals just satisfy and compensate each other's willingness to trade, and the combination, at the price shown by the tangent at Π will do no trade. The one individual will trade pq and the other p′q′, but these being equal and opposite $pq+p'q'=PQ=$ zero.

The addition of demand curves can thus be continued without limit, and so one can conceive of demand curves for "countries" being built up without any comparison or addition of different individuals' utilities, and the distribution of production between "countries" is determined.[1]

11. This presentation has further the advantage over the treatment in the first part of this article that it shows the amount of trade carried on between the two "countries" in pq, which is, of course, equal to p′q′ for the equilibrium position

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[1] The P.I.C.s of "countries" are of course not obtained by merely adding up the productive possibility of all the separate individuals in a country, but to a much greater extent by the combination of individuals into firms which enables them to take advantage of specialisation. It is difficult to bring this into consideration when using the highly abstract simplification of having two commodities only, but the difficulty might be overcome by regarding the *entrepreneur* as well as the owners of employed factors as having such employment as a possibility of production—a point on their P.I.C.s—which gives them the quantities of the commodities that they get in this way as the return from that possibility. There arise further difficulties from the interdependence of such productive possibilities, but these do not seem insuperable either. The purely technical possibilities must be taken by the economist as given, and can be expressed by a P.I.C. for the "country." For increasing and constant costs the only possible price relationship of the products is given for any productive distribution or point on the curve by the alternatives producible at the margin. This, in conjunction with the technical conditions, gives the rewards of every factor, which with the individual C.I.C.s gives the individual demand curves which can be added and applied to the technically given curve of productive possibilities. The equilibrium position will be that at which the collective demand curve touches the P.I.C. at the point from which the calculation started. That is, at that production where the market exchange relationship is equal to the ratio at which the goods are alternatively producible at the margin. Where there is not this coincidence there arises a tendency to produce more of the commodity which has the relatively higher price, and this movement by increasing the relative cost and/or diminishing the market exchange ratio of the commodity whose production is increased tends to bring about the coincidence and persists until the coincidence is brought about. The case of decreasing costs raises special difficulties which will be dealt with below.

when $PQ=O$. We can extract these quantities of "willingness to trade" and consider them separately.

In Fig. 4 we will measure positively quantities of X and Y that the first country will acquire at different exchange ratios, and we will measure negatively quantities that it will give up at these exchange ratios. As we wish to relate the willingness-to-trade of the first country to the willingness-to-trade of the second country we must measure negatively the quantity that the second country acquires, since these are the goods that the first country gives up ; and we must measure positively the goods that the second country gives up, for these are the goods that the first country acquires.

The "pq"s and the "p′q′"s of Fig. 2 are the willingnesses-to-trade of the first and second country, and we have only to transfer these lengths in their appropriate directions to Fig. 4 measuring them all from the origin of the system of co-ordinates. The "pq"s will be transferred directly as measured, and will give us the willingness-to-trade or demand curve $otz_az_bs\Pi o$ while the "p′q′"s have to be transposed in sense before they are transferred so that we get $ot'z'_bz'_as'\Pi o$. Only at the price ratio represented by the slope of the line $o\Pi$ does supply equal demand. That is therefore the equilibrium rate of exchange between the first and second country, the first country giving up Πr of X for *or* of Y, the second, of course, doing the reverse. Thus p′q′ which was equal and opposite to pq, having been reversed, now coincides with it in $o\Pi$. It can be seen that the section of the diagram near the origin in the top left-hand quarter is the familiar Marshallian construction. If the two "circles" are tangential at the origin there will be no trade between the countries. If conditions of production as well as tastes are identical in the two countries, the two demand curves will be similar in shape and symmetrical about the origin and will therefore be tangential at the origin, thus signifying the absence of trade. If the circles cut in the lower right-hand corner, trade will be in the reverse direction, that is, the first country will give up Y for X instead of X for Y.

12. The break in the demand curve z_az_b (and in the same way $z'_az'_b$) represents the quite negligible possibility of the point of "Bliss" in Fig. 2, being approachable by a line of exchange from the P.I.C. Lines of exchange which make this possible must be positively inclined, showing a negative price of each commodity in terms of the other, so that in order to acquire any quantity of one, instead of *giving up for it* a quantity

of the other it is necessary to *accept with it* a quantity of the other commodity. There will be no point on the P.I.C. having such a positive slope, so that the line of exchange will have to connect z with one of the extremities. Since at z the C.I.C. contracts to a point, it cannot be said to lie on one side or the other of the line of exchange so that we cannot follow the rule of connecting it with that extremity which would leave the P.I.C. on the opposite side. We must therefore consider it as capable of being reached from either extremity. It is reached from a when the line of exchange is az, being the extreme end of that part (tz) of the demand curve which is reached by a line of exchange from a and which is part of the " circle " having the diameter az. It is reached from b when the line of exchange is bz, being the extreme end of that part (sz) of the demand curve which is part of the " circle " having the diameter bz. All the " pq "s or quantities and directions of exchange that correspond to the section of the demand curve πqsz (Fig. 2) are shown in Fig. 4 in the section of the willingness-to-trade curve $o\Pi sz_b$, oz_b being the limiting line of exchange bz. Similarly the other half of the demand curve πtz of Fig. 2 is shown in otz_a of Fig. 4, oz_a being the counterpart of az. This leaves $z_a z_b$ unaccounted for. This is the part of the willingness-to-trade curve which corresponds to the rates of exchange between oz_a and oz_b. In Fig. 2 these prices are the lines of exchange between az and bz. In this range of prices, the optimum production for the individual would be that from which he could reach z by exchange. It is no longer necessary for the line of exchange to be tangential to the P.I.C. or to be limited to its extremities, for these conditions only apply to cases where shifting the line of exchange in one direction or the other (without turning it) could bring the individual on to a higher C.I.C. This cannot apply here, for there is no higher point than z. For all rates of exchange, then, between az and bz production will be at the point where ab is cut by the line of exchange drawn from z. This gives us $z_a z_b$ of Fig. 4 which is identical in shape with ab but reversed. The corresponding break $z'_a z'_b$ in the other willingness-to-trade curve will be identical in shape with $a'b'$, but not reversed, since the inversion of every $p'q'$ will have cancelled this inversion.

All this is seen more clearly when we consider the constant and increasing costs of Fig. 3 and the extraction of the willingness-to-trade curve in Fig. 5. Whereas in Fig. 2 only part of the demand curve consists of sections of the circles whose diameters are the lines joining z to the extremities of the P.I.C., in the case of the constant and increasing cost curves of Fig. 3 the demand curve is formed entirely from sections of such circles except for the straight line sections ΠA and ΠB in the case of constant costs as shown in section (8) above.

The demand curve for constant costs AΠTZSΠB is shown in the willingness-to-trade curve in two sections. AΠTZ is seen in OATZ$_a$ and ZSΠB in Z$_b$SBO, while Z$_a$ is joined to Z$_b$ by a straight line, since the inversion of the straight P.I.C. does not affect its shape. This gives us the willingness-to-trade curve OATZ$_a$Z$_b$SBO.

In the case of decreasing costs the demand curve ΠTZS of Fig. 3 is shown again in two sections: ΠTZ by ATZ$_a$ and ZSΠ by Z$_b$SB. Z$_a$ is joined to Z$_b$ by a line inverse in shape to the P.I.C., and therefore concave to the origin, shown by Z$_a$CZ$_b$. Between A and B the willingness-to-trade curve has a gap. This gap is the most important part of the diagram, for it indicates the special difficulties arising in the case of decreasing costs. How trade, if any, will take place if the other country's willingness-to-trade curve as a result of this gap misses the willingness-to-trade curve ATZ$_a$CZ$_b$SB cannot be established without a further elucidation of the fundamental assumptions.[1]

III

13. The difficulties that arise in connection with decreasing costs are due to the fact that any individual or " country " with a decreasing costs P.I.C. will always specialise, producing only X or only Y if there is any exchange ratio which can be taken by the individual or " country " as given. At any exchange ratio production will be at an extremity of the P.I.C.

This will not matter at all if the trade is done between this country and a country with increasing costs at an exchange ratio at which the two countries' " willingness-to-trade " are equal and opposite, and at which the other country will not be specialising—i.e. it will not be producing at an extremity of its P.I.C. but at some intermediate position on it. In this case everything is determinate. The exchange ratio is equal to the ratio between the quantities of goods alternatively produced at the margin in the increasing costs country; and at that exchange ratio supply will be equal to demand. This will be shown in the willingness-to-trade curve of the increasing costs country missing the gap in the willingness-to-trade curve of the decreasing costs country, and cutting this curve at a point which shows the trade done and the exchange ratio.

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[1] I am indebted to Mr. A. Emanuel for bringing to my notice this indeterminacy in the case of decreasing costs.

There is no serious difficulty even if both countries have decreasing costs, if when both are specialising, each in a different commodity, there is some exchange ratio at which their "willingnesses-to-trades" are equal and opposite. This would be shown in their willingness-to-trade curves cutting, both gaps being avoided. In this case there will be no indication of the exchange ratio from the production side in the form of the ratio between alternatively producible quantities of the different goods at the margin, but the exchange ratio is sufficiently determined by the condition of making supply= demand, and that is given by the intersection of the willingness-to-trade curves. This kind of one-sided determination is not peculiar to decreasing costs, but arises whenever both countries specialise and is mentioned in my previous article (p. 351).

14. The real difficulties arise when we have a country with decreasing costs which does not specialise. In my previous article (p. 352) I indicated that with two countries both having decreasing costs, one at least must specialise; this suggests the possibility that the other might not, and indeed in Figs. 5 and 6 of that article I describe conditions where one country with decreasing costs does not specialise. This seems to contradict the proposition put forward in this article that a country with decreasing costs *must* specialise if there is any market rate of exchange. The apparent contradiction is due to a difference of basic assumptions. If conditions of perfect competition are assumed, as they have been so far in this article, with everybody confronted with an *exchange ratio* which he takes as given rather than with a demand curve, then a decreasing costs country must specialise. But if the decreasing costs in a country are considered to have had their natural effect of leading to monopoly, then the monopolistic country is no longer faced with an exchange ratio but with a demand curve, and may find it advisable to restrict production of the commodity in which it would otherwise have specialised, and apply the resources set free in this way to produce some of the other commodity. The tendency to monopoly will show itself in the impossibility of obtaining an equilibrium position as long as competitive conditions prevail, for on account of the gaps in the willingness-to-trade curves, there may be no prices at which the supply is

equal to the demand. In these cases we must apply the principles of Monopoly Theory.

If this impasse is reached in the case where one country has increasing costs and one country has decreasing costs, we may consider the decreasing costs country as the monopolist. The monopolist can be considered as having, on the one hand, a set of real C.I.C.s, and on the other hand his P.I.C. as well as the *possibility of exchanging different quantities at different prices* with the other country. We have to add to his *production possibilities* his *exchanging possibilities* to get his total *possibilities of acquisition*. This can be represented by the curve obtained by moving the other country's willingness-to-trade curve (the lower " circuit " of Fig. 4) round his P.I.C., keeping the origin on the P.I.C. and the axes parallel and marking out the parts of the moving curve farthest from the origin in the way described in my previous article on p. 250, section (3). The equilibrium point will be where the resulting Acquisition Indifference Curve reaches a highest C.I.C. The distribution between production and exchange is determined exactly, as is the distribution between production in the two countries in the completely analogous additions of the P.I.C.s of two countries in my previous article.

The same procedure may be followed in the case of two countries both having decreasing costs. If one of them acts as a monopolist and the other accepts his price, we get a determinate equilibrium in exactly the same way. A completely different equilibrium will be reached if the countries reverse their roles, and the second country acts as the monopolist while the first accepts the prices. If both countries try to act the monopolist, and neither adjusts himself to the price proposed by the other, there develops a problem of tacit or open bargaining with a wide range of possible bargains and no determinate exchange equilibrium. The problem resolves itself into a simple case of bilateral monopoly.

15. Monopoly may of course also arise in the case of increasing costs, and in this case, too, the same reasoning holds good. As compared with the position reached under perfect competition the " terms of trade " will be turned in favour of the monopolist and against the competitive country, and the monopolistic country may be said to have gained by this change. This corresponds to Edgeworth's argument for small import or export tax.[1]

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[1] *Papers*, vol. ii, p. 39.

16. Finally it should be noted that the constructions both of this and of my previous article apply to any kind of trade, between individuals, towns, regions, countries, and continents as well as between social classes or between people at different points of time; and that it is only an historical accident of the development of Economic Theory that all these problems are called " International Trade."

Mrs. Robinson's "Economics of Imperfect Competition"[1]

By Nicholas Kaldor

I

Recognition that the unrealistic assumptions in regard to the nature of competition form one of the main deficiencies of the traditional theory of value, and are directly responsible for some of the apparent inconsistencies between the conclusions of theory and experience, constitutes one of the most significant advances of post-War economic thought. Traditional theory—tacitly rather than explicitly—was built upon the assumption that the elasticity of demand for the product of an individual producer with respect to the price charged by any other producer is either zero or infinite. In reality it is neither. Different producers are not selling either " identical " or " different " products, but " more or less different " products—the demand confronting them being neither completely sensitive nor completely unsensitive to the prices charged by other producers.

This necessitates a new analysis of the determination of value ; and Mrs. Robinson sets out in this book to provide us with such an analysis. But the performance at once exceeds and falls short of the promise ; the contents of the book cover a field different from that which we were led to expect from the title page. She neglects the intricate problem of the interaction of the price and output policy of rival producers and the dependence of each producer's equilibrium position on his own anticipation of this interaction (usually called the " problems of duopoly ") altogether ; although these ought to occupy a central position in the treatment of any competitive situation which can rightly call itself " imperfect," and she also excludes " marketing costs " from consideration—by the simple device of deducting such expenditures from the producer's demand curve—although, whatever views one may hold about these, there can be little doubt that their emergence is one of the most characteristic features of an " imperfect market." Under the circumstances it is not surprising that her book—after a most intriguing introductory chapter giving all the reasons for the necessity of a new approach to the theory of value—inevitably becomes a treatise on monopoly; a treatise most admirable in its lucidity, sharpness and the wealth of its material, but nevertheless a treatise very much on well-established lines. There is an elegance in the manner of presentation and the proof of her propositions about which any " pure mathematician " might justly feel proud ; and for these reasons alone more than one part of her book—such as the analysis of Price Discrimination in Book V—are destined to remain for a long time the standard text on their subject. There is, in fact, hardly a single proposition on the theory of monopoly, treated by Mrs. Robinson, where she does not succeed in simplifying and improving upon the existing method of presentation ; and there are quite a number of propositions—such as those dealing with the effect of monopolies on distribution—where she succeeds in carrying our knowledge a great deal further. No student of the theory of monopoly could fail to obtain a firmer and more inclusive grasp on the subject by reading her book, or to be grateful to her for saving the necessity of resorting to inferior or more cumbrous sources. But of " imperfect competition proper," of the problems peculiar to the type of situation presented by her at the beginning, there is little to be found; and such as there is is too tautological to improve our insight very much. In fact, one almost has the feeling that Mrs. Robinson could have written much the same book if Mr. Sraffa's path-breaking article (to which she acknowledges so much debt) had never been written ; and if the problem of " highly substitute but not identical " commodities had never presented itself in the course of the discussion on increasing returns.

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[1] *The Economics of Imperfect Competition.* By Joan Robinson. Macmillan, 1933. xii + 352 pp.

All this, however, is not meant as a criticism of the book itself; it could at best be regarded merely as a criticism of its title. For in the field which the book really covers it represents a brilliant intellectual achievement; and after reading some 350 delightfully instructive pages, it is hardly fair to complain that we have learnt something different from what we expected to learn or even from what she expected to teach us. For we have learnt quite a lot; and what we did learn was very well worth learning.

If one can make any general criticism, it does not so much concern her own propositions as the way she disposes of her predecessors. Some of the references to Marshall, for example, may be regarded as a trifle ungenerous, especially since she herself emerges—though I feel sure Mrs. Robinson would not admit this—as a true champion of Marshallian orthodoxy; and this sometimes in a field where Marshall himself might well have preferred to be unorthodox. Mrs. Robinson professes ultimate faith in the power of revelation of Plane Co-ordinate Geometry, in the handling of which she is a superb master; but her geometry—despite all the new curves and all the new properties discovered about them—is really ultra-Marshallian. In a sense, it represents the ultimate logical outcome of the Marshallian method. Whether this method is also the most convenient one for the analysis of the problems she wants to apply it to, still remains to be seen ; in our view the apparatus of the " curves " becomes progressively less useful as one makes the basic assumptions more realistic; since it then becomes increasingly difficult to exhibit the conditions of equilibrium by functions of one variable. But it is the road she herself has chosen; and as her chapters on "objections" show, she has few illusions about the difficulties that confront it. Her all too noticeable endeavour to dissociate herself from Marshall thus compares ill with the latter's constant attempts to associate himself with Ricardo.

II

Of all Mrs. Robinson's results, unquestionably the most valuable are to be found in Books VII-IX, which deal with the extension of the marginal-productivity theory of distribution to monopoloid situations. With the aid of the now famous elasticity-formula Mrs. Robinson can derive the monopolist's demand curve for a factor of production and thereby solve the general problem of distribution under a regime of monopolies. She thus shows that (assuming at first perfect competition in the markets for the factors themselves) hired factors of production will tend to receive their "marginal value products," i.e. the net increase in the value of output created by the addition of a single unit of a factor; which is always less (except under perfect competition) than the value of their own net product (since by their own contribution they reduce the value of the product of all earlier units). The tendency, therefore, shown by Wicksell,[1] towards an equality in the level of remuneration of the same resources, both in contractual and non-contractual employments, will not be necessarily realised if competition is not perfect—even if there is no "institutional monopoly" in the sense that any of the required resources are under a single control. For while the hired factors will receive less than the value of their marginal physical products, the profits of the entrepreneur—the remuneration for the use of his own resources—will always be higher than the value of the marginal productivity of those resources multiplied by their amount. (This will also be true in cases where the entrepreneur earns no more on his own labour and capital than what he could earn by hiring them out; only then the "marginal productivity" of his own resources in their given employment will be *less* than it is elsewhere.[2]) In denoting the difference between the values of the marginal net products and their actual remuneration as the measure of the "exploitation" of factors, we should not forget, however, that this difference is not something which factors could always receive if only the entrepreneur acted in a way a state of perfect competition would force him to act. For in cases where the average variable costs are falling, payment on the scale of the values of marginal productivities would actually involve the entrepreneur in losses. The sum of the values of the marginal products of hired factors is then greater than the total product.

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[1] *Lectures*, p. 125.

[2] A strict proof of this proposition requires the assumption of a "homogeneous and linear" production function. This can be assumed, however, even where "economies of scale" are present, so long as we assume that the fall in costs is due to the indivisibility of factors actually used and not the introduction of *new* factors as the scale of output is increasing; or, if it is due to the latter, that the "factors" are classified according to the specific form in which they are used and not according to the "original" resources from which they arise (e.g. a specific "machine" is regarded as a separate factor, and not the units of "capital" and "labour" which the machine represents). Then the sum of the marginal productivities of the factors, multiplied by their respective amounts, will be equal to the total product, and the marginal productivity of the "indivisible factor" will be negative so long as the average cost of all other factors is falling as output is increasing.

So long as we assume perfect competition in the markets for the factors themselves, factor prices, though not equal, will, at any rate, be exactly proportional to the value of their respective marginal productivities;[1] and consequently hired factors will be combined with each other in the same ratio as under perfect competition. This is no longer true, however, when the factor markets themselves are imperfect; and in consequence hired factors are subjected to "monopsonistic" as distinct from "monopolistic" exploitation. The "marginal value product" of factors will then tend to equal not their price, but their marginal costs, which is higher than price; and factors will no longer be combined in proportions at which their relative marginal productivities correspond to their price ratio (except in the special case when their elasticities of supply are all equal). Moreover, it can be shown that this change in the proportion in which factors are combined caused by imperfections in the factor markets implies a reduction in productive efficiency. For assuming a given total supply of all resources, variability of technical coefficients, and any given ratio in which different commodities are produced, it can be proved that the aggregate output will then be at a maximum when the factors in each employment are combined in such proportions that the ratio of the marginal physical productivities of the factors is everywhere the same. This condition remains fulfilled even if factors are everywhere subjected to "monopolistic exploitation" (however much the elasticities of demand for different commodities differ); it is unfulfilled as soon as "monopsonistic exploitation" enters the field. The latter brings about therefore a purely technical wastage of resources which is absent in the case of the former.[2]

Moreover, there is a difference from the point of view of policy, since the effects of monopolistic exploitation on labour are unavoidable while monopsonistic exploitation on the other hand, can be countered by collective bargaining or any similar device which makes the supply curve of labour horizontal to the individual employer. It would be a mistake, however, to draw too much upon this particular argument for the purposes of trade union policy. For it is difficult to think of cases where " monopsonistic " as distinct from " monopolistic " exploitation should still be considerable.[1]

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[1] Since for all factors the difference between the value of the marginal product and price is in the ratio of $\frac{\epsilon}{\epsilon - 1}$ where ϵ is the elasticity of demand for the commodity.

[2] There may still be, in this case, a "technical wastage" of a different kind: if, on account of the generation of "excess capacity," too little of the "hired factors" are combined with the "residual" factors (i.e. the entrepreneur's own resources). We shall examine this question on a later occasion.

Unfortunately, Mrs. Robinson's manner of exposition just in these parts of the book is not quite so admirable as the standard in which the rest of the book is written. Here, at any rate—perhaps just because these parts are full of new ideas—the exposition could be considerably simplified. There was surely no necessity for her purposes to introduce the concepts of average *net* and marginal *gross* productivity, which must cause considerable headaches to those who are not used to her own ways of thinking ; nor for the measurement of factors in terms of " efficiency units," which, on closer inspection, proves to be a very tricky concept indeed. For *different* factors of production can only be grouped together under " corrected natural units " if the elasticity of substitution between them is infinite; otherwise the multiplier by which their " natural units " must be " corrected " is indeterminate (depending partly on the ratio of the number of their natural units and partly on the amount of other factors with which they are combined). Mrs. Robinson seems to be aware of this difficulty, as her footnotes on pp. 332 and 344 show. But where are we to find resources between which the elasticity of substitution is infinite and which are yet normally classed as different factors ? Surely it is more usual to err in the opposite direction.

III

Lack of space makes it unfortunately impossible to examine Mrs. Robinson's analysis of " competitive equilibrium " in Book III—which is the most relevant part of the book from the point of view of imperfect competition theory. We shall hope to return to it on a subsequent occasion. Here I should like to confine myself to two points which concern not so much her actual conclusions as the technique adopted.

(i) The first of these concerns her concept of an "industry" (under conditions of imperfect competition). It implies the assumption that the products of different firms consist of a " chain of substitutes " surrounded on each side by a " marked gap " within which the demand for each firm's product is *similarly sensitive* with respect to the price of *any* of the others. The " boundary " is thus defined as the limit beyond which this sensitiveness ceases or at any rate becomes a different order of magnitude. No doubt for each *particular* producer there exists such a " boundary." But there is no reason to assume (except in some very special cases, involving a peculiar grouping of consumers) that this boundary is the *same* for any group of producers ; or that the sensitiveness of demand for the products of any particular producer is of the same order of magnitude with respect to the prices of *any* group of his rivals. Some producers will be " nearer " to him, others " farther off." If the demand for cigarettes in a particular village shop is more affected by the price of beer in the opposite public-house than by the price of cigarettes in the shop at the nearest town, which of the two would Mrs. Robinson lump together into " one industry ": the seller of cigarettes plus the seller of beer in the village, or the seller of cigarettes in the village plus the seller of cigarettes in the town ?[1]

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[1] Theoretically by the introduction of collective bargaining wages could be raised by a percentage equal to $\frac{100}{E}$, without causing unemployment (where E is the elasticity of supply of labour to the individual employer).

(ii) The second concerns her concept of a demand curve confronting an individual producer. The traditional " market demand curve " for a certain product is *not the same sort of thing* as the demand curve which is relevant in determining the actions of the individual producer. The first denotes a functional relationship between the price and the amounts bought from a particular producer. The second concerns the *image* of this functional relationship as it exists in the mind of the entrepreneur. The two may differ widely. The second may be much more, or much less, elastic than the first; it may be discontinuous while the " real demand curve " is continuous.[2] It is easy to say that the general assumption of " perfect knowledge " eliminates this difference. But it is important to remember that such an assumption is something quite different and logically much less satisfactory in the case of imperfect competition than in the case of perfect competition. (1) In the case of the latter, it only implies that people know the relevant prices (in the present or in the future) quoted in the markets. In the case of the former it implies a knowledge of hypothetical situations to which the price-mechanism may give no indication at all. (2) The " real demand curve " confronting the individual producer might be (and if the above argument is correct, generally will be) indeterminate; since it depends on the way *other* producers react on his actions (this reaction can take the form *either* of a change of price *or* of a change in the quality of the product, both affecting in different ways the first producer's demand), and these reactions under a régime of monopolistic competition, cannot be derived unequivocally from the " data."[3]

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[1] Mrs. Robinson is no doubt aware of the arbitrary nature of the assumptions underlying her concept of an " industry." But I doubt if she allows for the extent to which these assumptions are indispensable for her subsequent constructions. For it is only under the assumption that there is a large group of firms between which the preferences of consumers are evenly divided (i.e. the " cross elasticities of demand " are of the same order of magnitude) that we can draw up a " demand curve " for the product of each ; since it is only then that we can assume that a change in price by a single producer will not significantly affect the demand for any other single producer. Cf. p. 341 below.

[2] Since entrepreneurs generally have no more than a very vague idea of their own demand curve it is more reasonable to assume that this " imagined demand curve " is a discontinuous one. In which case marginal revenue may be equal to marginal cost at several outputs. The two may even cut each other at a point where marginal revenue is equal to price.

[3] Mrs. Robinson, following a suggestion of Professor Pigou, draws up a demand curve under the assumption that not the prices, but the " conditions of supply " of all other commodities are given and which then shows " the full effect upon the sales of a particular firm resulting from any change in the price it charges " (p. 21). But *this* method of drawing up demand curves is only legitimate under conditions of perfect

The " imagined demand curve " on the other hand, becomes determinate as soon as it exists in the producer's imagination—and since something always must exist there[1] the question of indeterminateness simply does not arise in this case. If on the other hand, by assuming perfect knowledge we make the two coincide, not only do we make the analysis unnecessarily unrealistic, but we introduce complications (by rendering the " imagined demand curve " indeterminate) which can be avoided.[2] (3) Moreover, imperfect knowledge regarding the " real demand curve " is consistent with a state of equilibrium in a sense in which imperfect knowledge in regard to prices is not. So long as a producer sells as much at a given price as he expects to sell, his erroneous ideas concerning the elasticity of demand at that price are quite immaterial. The " imagined " and the " real " demand curve are thus merely required to meet at one point—I admit, at the critical point—otherwise they may show the wildest divergence without upsetting " equilibrium." This not only implies that in the absence of " perfect competition " ignorance may persist with impunity; it also implies that under monopolistic conditions people's subjective estimates of their situation (apart from their actual situation) constitute one of the independent determinants of equilibrium.

Recent work in the theory of duopoly has also made it clear that that baffling question can only be satisfactorily treated by explicitly allowing for the entrepreneur's estimates of his rivals' reactions, as distinct from the actual reaction itself. This, of course, is not easy to do by " curves." But does it not seem probable, in the light of preceding remarks, that a more thorough-going recognition of this factor would both unify and simplify the whole theory of imperfect competition ?

competition. For it is only under perfect competition that the marginal cost curve becomes the supply curve of the individual firm. (On p. 22, on the other hand, she says that " we ignore the fact that the price charged at any one moment may alter the position of the demand curve in the future " from which one would infer that she regards the *prices* of all other products as given.)

[1] If the entrepreneur has *no* idea of his own particular demand curve at all, this is equivalent to an " imagined demand curve " which is completely horizontal up to the amount actually sold, and then becomes completely vertical. It therefore consists of a single " step." The better " idea " the entrepreneur has of his own demand curve the more of such steps will his imagined demand curve consist.

[2] Professor Chamberlin, who uses the same concept in his *Theory of Monopolistic Competition*, specifically assumes " perfect knowledge," and makes the demand curve determinate by assuming that the effect of a single producer's actions on any other single producer are always negligible, and thus will not induce him to change his own policy in turn. We have seen the reasons for doubting the legitimacy of such an assumption. Mrs. Robinson says at one place (p. 23) that " we shall assume that it is legitimate to make use of a two-dimensional demand curve, without inquiring how it is drawn up " from which one could infer that she is thinking of such an " imagined demand curve." But, unfortunately, neither her definitions on pp. 20-2 nor her subsequent analysis bear out this interpretation.

Book Reviews

Pitfalls in the Statistical Construction of Demand and Supply Curves. By RAGNAR FRISCH. Leipzig: Hans Buske. 1933. 39 pp. R.M. 3.60.

Statistical derivations of demand and supply curves must be based, in almost all cases, on data in the form of a pair of time series, one giving the average price of the commodity in question for successive periods and the other giving the quantity of the commodity sold, and therefore demanded and supplied, in the same periods. The main problem is whether price-quantity material of this kind is adequate for the determination of the elasticity of both demand and supply. In the short monograph under review, Professor Frisch investigates this problem from the point of view of the various possible sets of assumptions that can be made about the time changes in the demand and supply situations, i.e. about the nature of the unknown " shift distribution " over time. The discussion is designed, for the most part, to throw into prominence the difficulties that all investigators in this field must face, and to expose the fundamental errors in one particular method, that devised by Leontief.

The assumption underlying the class of investigations considered by Professor Frisch is that the elasticity of demand or supply is constant, not only for all positions on one demand or supply curve, but also for all time. Using a double logarithmic scale, a demand or supply schedule is represented by a straight line, the slope of which measures the elasticity. In the course of time, the straight line is shifted up and down, but the slope remains unchanged. The quantity of the commodity demanded or supplied depends, not only on the price, but also on the " shift " of the demand or supply as a whole, a shift which varies with time. The price-quantity material can only provide estimates of the demand and supply elasticities if the form of the shift distribution is known or assumed. Since the shift distribution cannot be obtained from the observed data, its form must be assumed and the elasticities, as statistically determined, depend entirely upon the particular assumption adopted.

The actual price-quantity material can, however, indicate an appropriate assumption in two extreme cases. A very high correlation between prices and quantities must be due either to stability of the demand or supply curve or to a high correlation between the demand and supply shifts. The stability case occurs when the demand curve or the supply curve does not shift at all over time, and the slope of the regression line in the highly correlated price-quantity material gives, at once, the elasticity of the stable curve. The case of highly correlated shifts can occur in various ways, e.g. when there is a connection between the trends of the demand and supply shifts over time. The regression line of the price-quantity material does not, in this case, indicate an elasticity but simply the historical trend connection between the shifts. The appropriate assumption, in the case of high price-quantity correlation, is thus either stability of demand or supply, or highly correlated shifts, and it is often possible to decide between these alternatives. On the other hand, if a very low correlation is observed between prices and quantities, then the assumptions of stability and of correlated shifts are ruled out. A possible, and convenient, assumption here is that the demand and supply shifts are uncorrelated.

Turning to Leontief's problem, Professor Frisch finds that the method determines two parameters which correctly represent the demand and supply elasticities provided that the following conditions are satisfied. Two price-quantity materials must be available for which the demand and supply elasticities are identical; the demand and supply shifts must be uncorrelated in each material; the price-quantity correlation and the ratio of the standard deviation of prices to that of quantities must differ significantly from one material to the other. It is highly improbable that two materials can be found to satisfy all these conditions and the validity of Leontief's method turns, in practice, on the answer to the question—what do Leontief's parameters indicate when one or other of the conditions is not fulfilled ? Professor Frisch takes up this question in detail, and the most important of his conclusions concerns the case where the price-quantity correlations are nearly equal in the two materials, the shifts not being absolutely uncorrelated. If the correlations are both appreciable Leontief's method becomes unnecessary. At the best, the parameters indicate the slopes of regression lines in the materials and must be interpreted either as the elasticity of a demand or supply curve which happens to be stable (one parameter being meaningless) or more probably as historical trend connections between the demand and supply shifts. The more obvious of the two main pitfalls encountered in the statistical derivation of demand and supply curves, is thereby illustrated. Any trend connection inherent in the time series of the data is likely to interfere with the results of the investigation, and the difficulty is to eliminate the trend in order to allow the true elasticities of demand and supply to show themselves. Leontief considers that his method overcomes the difficulty, but close analysis does not uphold this contention.

On the other hand, if the price-quantity correlations are both low, the parameters of Leontief become indeterminate. Any determinateness that appears in their practical evaluation is due to the presence of random errors in the data and is entirely without meaning. This case illustrates the second, and more dangerous, of the two pitfalls. If the parameters to be determined in a problem are ratios or the roots of an equation (as in Leontief's problem), cases must arise where the parameters assume the indeterminate form, zero divided by zero—provided that the material is perfect. But, when random errors are present in the data, the parameters actually take the form of a random error divided by a random error, and the presence of the errors creates a fictitious determinateness. It is essential to detect this case and to allow for the possibility of its appearance. It should be noticed that Professor Pigou's method of deriving elasticity of demand (*Economic Journal*, 1930, p. 384) can also give this case of fictitious determinateness due to random errors. The possibility of error is, however, more easily eliminated here than in Leontief's more complicated method.

The analysis of Professor Frisch's monograph is very condensed, but as clear as his approach to the problem permits. It is, however, by no means easy reading, and Professor Frisch concedes nothing to the "weaker brethren." Two things are evident. The statistical determination of the value of fundamental economic concepts provides a problem of the first importance and no investigation in this field can be undertaken lightly. The future progress of economic science depends largely upon the work of investigators, like Professor Frisch, who realise the importance of subjecting the concepts and conclusions of abstract economic theory to the test of statistical determination and verification.

R. G. D. ALLEN.

Monetary Theory and the Trade Cycle. By FRIEDRICH A. HAYEK. Jonathan Cape. 1933. 244 pp. 6s.

This book is a translation of Professor Hayek's well-known work which was published in 1929 under the title *Geldtheorie und Konjunkturtheorie*. Professor Lionel Robbins has written an Introduction, in which he stresses the "urgent need for a continuous series of translations which shall make available to economists in different countries the results of investigations in languages other than their own."

The purpose of the book is to show that only the monetary approach can lead to a satisfactory explanation of the Trade Cycle. There are, according to the author, three fundamental types of non-monetary theories of the Trade Cycle, namely (*a*) those which attempt to show that an increase in the demand for consumers' goods tends to bring about a disproportionate increase in the production of fixed capital; (*b*) the theories according to which industrial fluctuations are occasioned by the discrepancies between savings and investment; (*c*) psychological theories. All these theories agree in that they lay stress upon the contrast between the relative abundance of producers' goods and the relative scarcity of consumers' goods during the boom. But all the "disproportionality" theories fail to give a satisfactory answer to the following objection: Why are the forces which, according to static economic theory, might be expected to restore equilibrium—namely, the rise in the prices of the factors of production and more especially in the rate of interest—*ineffective* during the boom, so that they only come into action after a rather long period has elapsed ?

According to Professor Hayek this "gap in the reaction mechanism" is due to the elasticity of credit, a circumstance which is also tacitly assumed by the disproportionality theories. It is this fact alone which explains how the production of capital goods can be pushed beyond the limits set by the available supply of real savings.

It is, however, not necessary to assume, as current monetary theories of the Trade Cycle do, that the monetary causes act only in so far as the value of money—which is measured by the general price level—changes. On the contrary, the leading idea of Professor Hayek's book is that the mere fact of a variation in the volume of money, even if the level of general prices remains constant, is sufficient to " dissolve the closedness of the system " and " to open the way for tendencies leading away from the equilibrium position."

Examining Wicksell's theory, whose fundamental importance he recognises, Professor Hayek observes that when, as happens in an expanding economy, the stability of the price level can only be secured by an increase in the volume of money, the rate of interest which keeps the value of money stable will not coincide with that rate which brings about an equilibrium between the demand for capital and the supply of real savings. Then the stability of the value of money would not prevent disturbances of equilibrium, that is to say, an altered distribution of productive resources between producers' goods and consumers' goods.

Are changes in the volume of money the consequence of arbitrary interferences of the monetary authorities—as current monetary theories of the Trade Cycle generally assume—or are they an " immanent " characteristic of the present credit organisation? Professor Hayek accepts the latter view, thus stressing the " endogenous " character of his theory. According to him the Trade Cycle begins in most cases with an improvement in the expectations of profit, which results in an increase in the demand for credit. Professor Hayek then proceeds to prove that in the present credit organisation it is plainly impossible for the banks to adjust quickly the rate of interest charged by them to the rise in the natural rate of interest. The result is that the " interest brake " fails to operate. Productive resources are devoted to the production of fixed capital in greater quantity than can be accounted for by the supply of real savings. Necessarily, however, a moment must come when the banks will cease to extend credits. Then the money rate of interest suddenly rises to its natural level, " and this will render unprofitable (temporarily at least) those investments which were created with the aid of additional credits." The crisis makes its appearance. Thus, the elasticity of the volume of money—that is to say, the readiness of banks to adjust the volume of money to the requirements of business, which is generally considered as one of the principal advantages of the present credit organisation—is, in Professor Hayek's opinion, " the element whose presence forms the necessary and *sufficient* condition for the emergence of the Trade Cycle " (italics mine).

This conclusion might seem too sweeping, especially in view of some recent experience which has proved that, owing to the inelasticity of the demand for accommodation in periods of depression, the expansive policy of banks was without effect, when other causes did not co-operate to bring about a trade revival. The monetary approach does not lead, therefore, to a complete explanation of the Trade Cycle and it must be clearly understood that the monetary factor can be considered as the sufficient condition of the boom only if the other condition, namely, the increase (in the schedule sense) in the demand for credit, is present. With this Professor Hayek, of course, agrees; but he contends that it is not the occurrence of a " change of data " which is significant, but the fact that the economic system *reacts* in a different way, when the volume of money is elastic, than when it is kept constant.

According to Professor Hayek there is a fundamental difference between the effects of *voluntary* saving and of *forced* saving. (This idea has been further developed in the other book, *Prices and Production*, which the author wishes to be considered as an essential complement to the *Monetary Theory*.) In both cases saving will lead to an elongation of the process of production; but in the first case this elongation will be permanent; while, in the second case, at the moment when the banks cease to extend credit, forced saving also ceases, and the elongation of the process of production cannot be maintained, which will inevitably result in a crisis. This point of Hayek's theory has aroused strong criticism. However, in my opinion this criticism does not take into account the most unstable situation arising from forced saving, when this latter is the consequence of bank credits being granted in excess of deposits (the situation is different when forced saving is brought about by taxation, or by industrial concerns investing themselves a part of their profits instead of distributing them to the shareholders). Credits given by the banks to industrialists for the purpose of extension or improvement of industrial plant—or credits enabling speculators to buy newly issued shares of industrial concerns—are not self-liquidating. They presuppose that private investors will be the ultimate purchasers of the new shares or debentures, so that the industrialists or the speculators will be able later to repay their debts to the banks, and the bank borrowings will be replaced by long-term funds, afforded by voluntary savings. But if the amount of voluntary savings, which were expected to be forthcoming in the future, has been over-estimated and too much credit has been created over and above actual savings, part of the newly issued shares and debentures will remain unsold, their market price will fall, and part of the credits granted by the banks will " freeze," so that these latter will be obliged to restrict their loans.

As regards " forced saving " I have attempted to show in a paper published in 1926[1], that much light can be thrown on the Trade Cycle by a close examination of the changes which have occurred in some European countries as a consequence of paper inflation. Inflation, and more especially " hyper-inflation," may be compared with a magnifying glass, which has allowed of distinctly observing many facts not easy to disentangle when following out the sequence of events during an ordinary Trade Cycle. The changes in the structure of production, brought about by inflation, and later by currency stabilisation, were most apparent in Germany. During the inflation period the substantial fall in real wages, which meant a " forced saving " on a large scale, allowed the productive resources of the country to be deflected from the production of consumers' goods to that of fixed capital. This continued as long as the new issues of paper money exerted a pressure upon real wages. But the situation changed when the value of money was stabilised. Then an adjustment of real wages began, which showed the insufficiency of the " fund for the maintenance of labour." The demand for consumers' goods increased, that for producers' goods on the whole declined, and the prices of these latter diminished relatively to those of the former. This resulted in a redistribution of productive resources. A shift to the production of consumers' goods was distinctly observed in 1924. The so-called " stabilisation crisis " with its most striking feature, the " scarcity of capital," was nothing else than a readjustment of the whole structure of production, which had been distorted during the inflation period. It seems to me that these facts are significant for Professor Hayek's theory, even if his view on the limited value of inductive verification be accepted.

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[1] " La crisi della stabilizzazione " (*Giornale degli economisti*, January 1926). See also " Le influenze del deprezzamento monetario sulla produzione in Germania " (*Rivista bancaria*, Milano, 1924).

Faculty of Law, Giza (Cairo). C. Bresciani-Turroni.

British Industries and Their Organisation. By G. C. Allen. Longmans, Green and Co. x + 338 pp. 10s. 6d.

The first two chapters of this book outline the main features of British industrial development up to 1914 and indicate the changing position of the staple industries. The last two chapters discuss the general post-war trend and changes in structure. The rest of the book considers the history and present position of certain leading industries. There is a chapter on Coal and one on Iron and Steel; a general account of Engineering is followed by a more detailed examination of Shipbuilding and Marine Engineering and of the Motor Trade; and a general account of Textiles is followed by a closer survey of Cotton and Woollen and Worsted.

Thus Professor Allen is not engaged in deducing what would happen under assumed conditions, but in describing what has happened and explaining why: a kindred task of at least equal importance and of greater difficulty. The result is a useful and interesting book, based upon wide reading and a remarkable knowledge of technique, especially of engineering technique.

What conclusions are we to draw from the facts which Professor Allen presents so admirably? He himself is in full agreement with those who urge that more " adaptability and resilience " in the face of changing conditions would have led to greater progress. Yet he seems at times to regret the changing conditions. As he surveys the industries and districts which have suffered, he seems to sigh for a steadier demand, for more stable conditions, for an approach to stationary equilibrium. But this is inconsistent with his own desire for a higher general standard of living, for this way lies stagnation. The changes of the last two decades have doubtless worsened the relative economic position of this country, but it should not be forgotten that even during the depression the general standard of living has been quite considerably higher than before the war. The difficulties of the staple industries, grave as they are, do not give a complete picture.

On the other hand, Professor Allen seems to give too much weight to the increase in output per person employed as a measure of growing efficiency. Yet, of course, such an increase may be associated with increasing unemployment, the closing of inferior mines, etc., the substitution of capital for labour owing to relatively high wage rates, or (in the short run) with the consumption of capital.

Many critics of British industry advocate larger units and more integration and mass production. On the whole, Professor Allen is against them. There is still much to be said for the relatively small firm. It makes for greater flexibility and more rapid adaptation; and the wise policy for Great Britain is surely to make the most of such comparative advantages as she still has rather than to follow the lead of other countries, in which the proportions of the factors of production available are different.

This book can be especially recommended to those who think of " an industry " or " a firm " as producing a single homogeneous commodity and to those who think " planning " would be comparatively easy.

F. Benham.

Studies in English Trade in the Fifteenth Century. Edited by Eileen Power and M. M. Postan. George Routledge and Sons. 1933. 455 pp. 21s. net.

The Mediæval Mason. By Douglas Knoop and G. P. Jones. Manchester University Press. 1933. 306 pp. 12s. 6d. net.

Studies in English Trade consists of seven separate essays as follows: " English Foreign Trade (1446-82)," by Professor Gray; " The Wool Trade," by Professor Power; " Anglo-Hanseatic Relations (1400-75)," by Mr. Postan; " The Iceland Trade " and " The Overseas Trade of Bristol," both by Miss Carus-Wilson; " The Grocers of London," by Dr. Thrupp; and " The Financial Relations of the Lancastrian Government and the Staple (1449-61)," by Dr. Haward. The book ends with elaborate tables of " Enrolled Customs and Subsidy Accounts from 1399-1482." They have, however, more in common than the titles would suggest, for they have grown out of the work of a *seminar* conducted by the two editors. The *seminar* is a comparatively recent importation into this country and its productions are still regarded with a certain distrust. Roughly speaking it has given us a high standard of original research and a large number of ill-written, ill-digested books. There has been a tendency in such works to include an immense *apparatus criticus*, as though the writer was loath to discard the contents of his card catalogue, with the result that the reader is unable to see the wood for the trees. It is the peculiar merit of this remarkable book that, in avoiding this fault, it contrives to have it both ways. These studies, almost without exception, are admirably written; the writers are well above their material and their book is a most readable one for ordinary people. And yet behind them lies a far more exhaustive and at the same time discriminating study of the manuscript sources than has yet been applied to work of this kind. The effect of working together has been to ensure a high common standard of technical research, and a certain pooling of results, so that each has covered more ground than would have been possible if the work had been done in isolation.

The editors tell us they were drawn to their subject as the most neglected branch of study in the most neglected century of English history. The neglect is due, in part at least, to the sheer bulk of the public records. Though these have now been made really available by the scores of *Lists and Indexes*, not much, except the Patent and Charter Rolls, has been calendared. Even the *Close Rolls* are still uncalendared beyond the reign of Henry V. These studies are thus in the best sense pioneer work, remarkable in that they have made a systematic attack on a huge mass of unprinted evidence, in particular upon the Customs Accounts. They make no claim " to say the last word," and they deserve special praise for preserving a sense of proportion and a perspective in this confusion of sources. It is, for instance, a good thing that the notes and references to sources have been kept within reasonable limits, though I consider the decision to print them at the end of the book very regrettable. Is this a concession to the prevalent tendency to make history books "popular"? Every historical book that looks higher than the circulating library needs notes and these notes should be footnotes. In this volume the notes are irritatingly tucked away among the tables of enrolled accounts and the appendices. I can remember no book since the *Growth of the Manor* which is more difficult to handle.

The essays may be divided into two groups. Those of Professor Gray and Dr. Haward are demonstrative and to a certain extent contentious, since they are intended to prove a particular hypothesis. The remaining five are, broadly speaking, descriptive. Professor Power's essay appears to have evolved from her vivid article in the *Cambridge Historical Journal* (1926). It describes the " technique of the English wool trade and the activities of the Staple," skilfully combining the literary and the record evidence; and thereby increases our impatience for the definitive treatment of the subject which we expect from her. Mr. Postan, whose subtle mind is perhaps more naturally adapted to the abstract questions of " Credit," writes a very clear-cut narrative of relations with the Hanse. Dr. Thrupp brings a curiosity that is very modern to the understanding of a medieval " mystery " and like his colleagues is careful to avoid over-simplification of the factors involved. Opinions will differ as to the relative interest of these essays, in accordance with personal predilections. My own preference is for the two studies of Miss Carus-Wilson, at once the simplest reading and the best. No discussion of abstract economic questions is allowed to intrude into the narrative, which in apparently attempting least, perhaps achieves most, though some of her skill doubtless lies in the choice of her subjects.

Professor Knoop and Mr. G. P. Jones have much in common in their aim and methods with the authors of *Studies in English Trade*. They, too, are trying to satisfy a curiosity alien to the thought of all but the latest medieval writers, and are thus largely thrown back upon record material. And since the evidence is, though very large, more direct and more manageable, they use it with an even surer touch. Their object, clearly stated in the first sentence of the book, is to write the " economic history of the stone-building industry in England during the later Middle Ages, and attempt a picture of the conditions under which the medieval mason worked and lived." It is, so far as I know, a new line of approach; and in a book which never wanders from the point, they break new ground in every chapter. Old-fashioned students of the Middle Ages (like myself) will be slightly shocked at first by the classification of masons into " automatic manual workers," " responsible manual workers," " automatic brain workers," and " responsible brain workers," by the discussion of " seasonal unemployment," or the equalising of a " clerical supervisor " with a modern " speed boss." But if the authors dispel the illusions of a generation still brought up on Montalembert, they give us in exchange a more convincing picture of craftsmen in a capitalist industry, who like most of us to-day were " mere wage-earners "; who were not seldom " impressed "; who sometimes ran away and whom economic necessity compelled " to seek out new stone-working jobs in other districts as jobs in their own district failed." Here and there we may doubt the soundness of the method which seeks to measure medieval industry from the intellectual standpoint of modern economic conditions. Are the authors, after all, asking the right questions, even though, as is the case, they are scrupulously careful not to go beyond their data in answering them ? Yet it remains an astonishing book, for the authors have carried back into the remote past a sympathy for and understanding of the lives of common men, which would have been impossible in any other age but our own. It is not a big book, and it is, as it needs to be, fully documented. The reader will be borne along by the interest of its subject, while wondering perhaps what after all is the right way to approach the past. And he will be well advised to read as well the authors' articles in the *Ars Quatuor Coronatorum* and the *Economic History Review*. These are careful studies of particular building operations at Vale Royal Abbey, Beaumaris, and Carnarvon, Eton College and London Bridge; and while this book generalises their conclusions, it in no way supersedes them.

V. H. GALBRAITH.

The Common Sense of Political Economy. By P. H. Wicksteed. Two volumes. Routledge. 1933. 871 pp. 8s. 6d. and 12s. 6d.

The republication of Wicksteed's *Common Sense* is a cause for great satisfaction. It is not only that it is, in its way, an excellent textbook; it takes complex ideas to bits, and sets them out with infinite patience in little pieces, so that the reader requires no intuition but only perseverance, in order to arrive in the end at a sound appreciation of most of the fundamental truths of economics. But if this were all we could simply label the *Common Sense* as a good textbook for a certain kind of student; other people, and perhaps more intelligent people, would be well advised not to waste time on it. What make it not merely a good textbook, but an economic classic, are its original contributions to the pure theory of value.

The theory of value stands in much the same relation to the rest of economics as philosophy to the natural sciences. It is possible to be a very good economist and at the same time to have rudimentary ideas on the theory of value, or to work on the basis of a theory of value fifty years out of date. But it does not follow from this that the pure theory of value is not worth study. For, like philosophy proper, this economic philosophy is capable of opening up new fields of research and new methods of enquiry; and, most important of all, it is capable, in its own way, of providing sudden illuminations, which change the whole scientific attitude of those who experience them, and give a new inspiration.

One such revolution in the theory of value took place in the 1870's, with the general adoption of the idea of marginal utility. That conception, though immensely fruitful in its technical application, was yet in itself very crude, as philosophers were not slow to point out. Naturally, however, it was left for economists to discover a means of setting their technical apparatus on a firmer foundation. This was done in the end by Pareto, whose reduction of utility-functions to scales of preference is probably the most important thing he ever did.

Wicksteed stands to Pareto in the same sort of relation as Bruno or Galileo to Copernicus. What in Pareto is essentially a mathematical dodge to overcome a logical and mathematical difficulty, becomes in Wicksteed a philosophical revolution. Wicksteed perceives that the new conception of utility implies (1) that economics must be henceforward much more individualistic in its methods, that the choice of the individual is the only psychic *datum*; (2) that its " logic of choice " is in no way confined to those problems which have been conventionally treated as economic, but is universal for human conduct. If, by this change of view, economics is in one sense restricted, it is in another sense enlarged. And it remains to be seen whether the enlargement does not offer a new and better way of dealing with those problems which the earlier utility schools grasped in a false way.

In this field Wicksteed was breaking new ground; and, like most explorers in the realm of ideas, he did not always succeed in emancipating himself completely from the outlook he was engaged in casting off. There is an interesting example of this in that very chapter on "Business and the Economic Nexus," which otherwise contains the very core of his teaching. After demonstrating, in a wholly convincing manner, that altruistic action is not necessarily to be excluded from economics, he nevertheless maintains that "the note of a business transaction between *A* and *B* is not that *A's ego* alone is consciously in his mind, but that however many the *alteri* are, *B* is not one of them. . . . The specific characteristic of an economic relation is not its *egoism*, but its *non-tuism*."

Now it is not altogether clear whether Wicksteed, in maintaining this proposition, is merely saying that the actions he proposes to classify as economic are like that (and of course it is a definition which includes practically everything most people do reckon as economic), or whether he is seriously laying down a limitation on the applicability of economic logic. If it is the second (and, judging by the fuss made, it certainly looks like it), then he is surely, on his own showing, wrong. For the real point of his whole doctrine is that things like egoism and altruism are part of the content of human preferences, while economic analysis is solely concerned with the form of the preference-schedule, and can start off with any preferences whatever—with certain purely formal exceptions. (For example, there can be no economics for a man who is entirely prepared to take what he is given and has no preferences at all; or for one who works entirely on a fore-ordained plan, which lays down a line of conduct for *all* emergencies.) Now there is nothing in these formal requirements to rule out a considerable degree of *tuism*. A bargain in which both parties are wholly *tuistic* is perfectly possible. "I will take my medicine if you take yours" satisfies all the canons of an economic relation.

Tuism only prevents relations being economic when it takes the form of a complete coincidence of the preference schedules of the related persons over the relevant range. If *A* wants *B* to have *X*, and *B* also wants *X*, then there is no room for exchange, but only for gift. In this case, however, the obstacle to exchange is truly formal.

This criticism of Wicksteed may seem trifling, but I do not think it is as trifling as it appears. For one important class of social relations to which we may well desire to apply economic analysis is appreciably *tuistic*—the relations of the State to its subjects. To take Wicksteed literally might therefore involve a greater impoverishment of economics than is in any way necessary, or is consistent with the spirit of his analysis.

We have been concerned so far with that strand of Wicksteed's thought which descends from Pareto (and probably also Pantaleoni); it is by far the most valuable aspect of his work. But there is another strand too, equally foreign to the English Marshallian tradition, though based this time, not on ideas which are post-Marshallian, but on ideas of which Marshall was aware, but which he rejected. This is the Austrian strand; its most striking manifestation is the doctrine of the reversal of the supply curve.

The characteristic device of the " Austrian " method of economic analysis—due originally to Menger—is the treatment of the individualistic exchange economy *as if* it were a socialised economy; so that the whole question is simply one of the allotment of the resources available to society as a whole among the ends of the individuals composing society. Now there is no question that this device is very brilliant and very fruitful; it has led to unquestionably valid results which would not have been reached so soon or so easily by other methods; and probably its fertility is by no means exhausted yet. Nevertheless, it is after all a device; it suppresses characteristic features, indeed the most characteristic features, of individualism; while of course never denying them (that would be absurd), it sets them in the background, and is reluctant to allow them to penetrate the structure of its argument. It thus tends to under-stress the distribution of the available resources among their owners.[1]

Wicksteed's famous reversal of the supply curve is a remarkable example of the abuse of this method. The point of the reversal is that it admirably serves the needs of the Mengerian approach—it allows us to see the working of the market as a distribution of resources among ends. But, fruitful as this comparison of the market to a socialised distribution may be, the market is not really a socialised distribution of resources; it is an exchange among individuals of the resources over which they have control. The two things have most instructive features in common, but they are not the same.

This skewing of the problem was really less excusable in Wicksteed than it was in the Austrians, for Wicksteed was a competent mathematical economist, and the mathematical analysis of the market discloses new reasons why the reversal of the supply-curve is unsatisfactory. (It is certain, therefore, that neither Pareto nor Walras could have accepted it).

If, on a market, a particular person is buying commodity X and giving commodity Y in exchange, then his demand-curve for X is determined by two circumstances.[2] (1) A fall in the price of X leads him to substitute X for Y; (2) a fall in the price of X increases his real income, i.e. his power of disposing over X and Y taken together. In the normal case this latter consideration also will be favourable to increased consumption of X. In such normal cases the demand-curve for X must thus necessarily slope downwards from left to right. Exceptions to this rule become possible only when X is an " inferior " good, such that the demand for it is reduced by an increase in real income.

When, however, we turn to Wicksteed's pseudo-demand-curve (the

[1] This criticism must not be taken as necessarily applying to contemporary Austrian thinkers.

[2] Hicks and Allen, " A Reconsideration of the Theory of Value," ECONOMICA, February-May 1934.

demand-curve for X on the part of the holders of X) the situation is totally different. There is still just the same " substitution " effect as before; but the effect on real income is reversed. A fall in the price of X now diminishes the power of disposing over X and Y together, and, in the normal case, this will make for a diminished consumption of X.

In the normal case, therefore, while the true demand-curve must slope downwards, Wicksteed's pseudo-demand-curve is not obliged to slope downwards in the ordinary way. It is indeed fairly clear that a continuous rise in the price of X must ultimately tend to increase the reservation demand from the holders of X. For, from their point of view, a rise in the price of X is a fall in the price of Y; and if the price of Y falls far enough, their demand for it is likely to become inelastic.

It is only in the case of an " inferior " good that the pseudo-demand-curve will have the familiar shape, and will cut the price-axis as Wicksteed draws it. But this is the very case in which the true demand curve may not behave normally.

The supply-curve is not merely a demand-curve reversed; for the reversed supply-curve has properties which are definitely different, and to some degree opposite, from those of a true demand curve. This difference only disappears if we make Marshall's assumption that the marginal utility of Y is constant, i.e. that the change in real income has no effect on the demand for X.

" A la suite de Professor Marshall, plusieurs économistes ont cru pouvoir, en général, pour de faibles variations des prix et des quantités, considérer l'indice d'ophélimité de la monnaie comme constant. . . . Les formules que nous venons de donner font voir qu'on ne saurait admettre cette proposition."[1] It is odd to find Wicksteed and the Austrians " dans cette galère! "

The *Common Sense* is a good textbook, and a great inspiration; and even if its Austrianisms are not always acceptable on a last analysis, these are defects of a mode of thought without which economics would be much the poorer. J. R. Hicks.

Gold and Monetary Stabilisation. Harris Foundation lectures by Jacob Viner, Gottfried Haberler, H. Parker Willis, Lionel D. Edie and John H. Williams. The University of Chicago Press. 1932. xi+173 pp. $2.00.

In this volume the lectures delivered in 1932 under the Norman Wait Harris Memorial Foundation have been reproduced. These lectures were devoted to problems of the gold standard and monetary stabilisation.

Dr. Haberler's lecture on Money and the Business Cycle is an extremely lucid exposition of the Austrian theory of industrial fluctuations. He deals with the fundamental phenomenon of the business cycle, the wave-like movement of business activity, and does not consider here the more dramatic but secondary phenomena such as breakdowns, bankruptcies and financial panics. One of the chief characteristics of the business cycle is the increase in the supply of means of payment during the upward swing of business activity and the decrease during the downward swing. Clearly every theory of industrial fluctuations must take into account this monetary factor. The increase in the supply of means of payment may be due to the banking system either lowering the money rate of interest below the equilibrium rate or omitting to raise the money rate when the equilibrium rate rises.

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[1] Pareto, *Manuel*, p. 585. Marshall was of course relatively innocent. His constant marginal utility of money was a simplifying assumption, consciously and deliberately made, if a little over-used.

Dr. Haberler explains that stability in the general level of prices is not a sufficient criterion for the regulation of the supply of money. Economists have often failed to distinguish between a fall of prices which is due to " an actual contraction of the circulating medium " and a fall of prices which is caused by a " lowering of cost." If costs are falling, a stable price level can only be maintained by increasing the supply of money. Such an increase in the supply of money will lead to distortions in the economic system in much the same way as an increase which causes prices to rise.

The essence of the Austrian theory is that, just as there can be disproportionalities in the horizontal structure of production, that is, overproduction of certain consumption goods relatively to other consumption goods, so there can be disproportionalities in the vertical structure of production. There must exist a certain equilibrium distribution of resources directed to the upper and lower stages of production. During the upward swing in business activity, when the supply of money is increased, the process of production is lengthened. This increase in investment is made possible by forced saving. It is clearly shown that when the lengthening of the process of production is not justified by an increase in voluntary saving, a reaction must inevitably take place. This reaction is the depression, and it is during the depression that readjustments in the vertical structure of production are made.

This explanation of the trade cycle throws a good deal of light on the course of events in the United States during the last decade. From 1924 until 1928 there was a great increase in the volume of production and prices were maintained fairly stable by increasing the supply of money. Depression was inevitable, and it is not surprising that President Hoover was unable to prevent it being prolonged by beating the prosperity drum.

In his lecture on Federal Reserve Policy in Depression, Professor Parker Willis maintains that " inflation is never a remedy for anything." He accepts the view that a period of depression is due to a preceding period of inflation. The policy of low rates of interest and large purchases of open-market securities, which appears to be the policy of the Federal Reserve System during a depression, is, therefore, considered to be indefensible. Thus, as regards monetary stabilisation, Professor Parker Willis comes to somewhat the same conclusions as Dr. Haberler. His analysis is, however, less profound.

Professor Viner, in his lecture entitled " International Aspects of the Gold Standard," first explains the changes which, on balance, have gradually made the gold standard more difficult to operate. He points out that the gold standard would long ago have been found impracticable except for the development of the two main instruments of central bank control, bank rate and open market operations.

In discussing post-war monetary policy, Professor Viner stresses the importance of the accumulation of 70 per cent. of the world's monetary stock of gold by the United States and France. He speaks of the " anarchic way in which the gold standard has been operating " and of the " world's ill-regulated gold standard." One differs from such an authority as Professor Viner with diffidence. But if one accepts Dr. Haberler's thesis as being fundamentally correct, there appear to be certain difficulties in his interpretation. It appears that the Federal Reserve authorities were faced with a dilemma. Whether they realised it or not is another question. If they had wished to prevent the inflow of gold they would have had to increase the supply of money to a greater extent than they actually did, and thus raise the general level of prices. This would have meant investment in excess of voluntary saving, an over-lengthening of the process of production. A depression would have inevitably followed. The alternative was to have maintained the supply of money constant and allowed prices to fall with increasing productivity. This would have meant a continuous inflow of gold into the United States and deflationary pressure in those countries whose gold reserves were being depleted. Actually the Federal Reserve authorities compromised by increasing the supply of money and stabilising the general level of prices while productivity was increasing.

Professor Viner says: " For other countries on the gold standard this maldistribution of gold meant inadequate gold reserves, a constant threat to the integrity of their currencies, and a deflationary pressure on their prices in spite of embarrassingly rigid labour and other costs and inflexible internal and external public debt burdens." There is, I think, little evidence of there having been such a deflationary pressure. In the United Kingdom, where it has often been maintained that the post-war gold standard has caused deflation, the supply of bank deposits was not decreased but actually increased during the period 1926 to 1930.

Professor Williams discusses the conflict between the gold standard and domestic monetary stability. He also considers the practical problems of relieving the depression, with special reference to the recommendations (see Appendix I) of twenty-four economists who were present at the Harris Foundation lectures. To deal with the immediate problem, Professor Williams supports the policy of reflation. He does not, I believe, attach sufficient importance to the analysis in Dr. Haberler's lecture on Money and the Business Cycle.

In discussing the future of the gold standard, Mr. Edie emphasises the importance of a new development which has been taking place. He points out that, under gold-standard arrangements, there is no longer an automatically controlled supply of money. A buffer has been created between the credit structure and the gold base. This buffer is in the United States the member bank reserve balances. More generally, we can say that it is the note issue of a central bank, plus its deposits, as far as they are bankers' deposits. Mr. Edie believes that the real threat to the gold standard is to be found in the misuse of this buffer. For example, the excessive contraction of credit which has been witnessed in the United States during the past two years. There is no doubt that the misuse of this buffer is a real threat to the gold standard. In the case of the United States, however, the real misuse of the buffer was before 1929 rather than after that year. The creation of this buffer is, of course, not to be regretted as it is the essential condition for an intelligently managed gold standard.

J. C. GILBERT.

A Critique of the Gold Standard. By H. L. PUXLEY. Allen and Unwin. 1933. 272 pp. 10s. 6d.

On the jacket of this book we are promised "a most convincing exposition of the inadequacy of 'orthodox Gold Standard Theory.'" A thrilling prospect which is hardly fulfilled when we find that there is practically nothing in the criticisms which is not already familiar to readers of the leading English writers on monetary problems. Mr. Puxley has followed up argument after argument with impressive arrays of supporting facts, and before we are half-way through the book the Harriet Martineaus and the Mrs. Marcets of gold standard theory have been relentlessly ground to powder.

This battle is divided into four long skirmishes. Chapter II shows that money in circulation, the banks' cash reserves and bank deposits can and do vary independently of one another. This could easily have been proved without resorting to a demonstration (p. 37) of the variability over the months of a single year of the "Big Five's" cash rations. Chapter III shows that Central Banks are no longer bound by the requirements of the external situation—and therefore do not vary internal credit conditions according to gold movements. The victory in this skirmish is based on a discussion of Central Bank actions 1923-31, which concludes that the period shows a "new philosophy" of using "the instruments of Bank Rate and open-market operations, which were formerly trusted to subserve the purpose of facilitating the work of the gold standard for the alternative, and often incompatible, aim of internal stability of prices." But from this discussion something is missing. In his researches, and among his cuttings from the *New York Times*, Mr. Puxley has forgotten those mysterious transatlantic voyages of a certain Professor Clarence Skinner. So we will forgive the naïvety of his conclusion.

The battle is now soon finished by Chapters IV (showing how Bank Rate could not control the enormous movements of short-term funds of recent years) and V (on War Debts, Reparations, and Tariffs). These two chapters include some account of post-war foreign investment and of the development of the financial crisis.

"The Dilemma" (Chapter VI) now arises, a dilemma between clinging to an international standard which has been proved impossible, and the pursuance of a policy of "internal stability." The latter is shown to be a forlorn hope, mainly on the basis of a superficial discussion of Bank Rate possibilities and an appendix which summarises American monetary events of the last ten years. The author then returns to the gold standard, hoping it may be made workable. He is perturbed by the threatened scarcity of gold, and elaborates the suggestions of the Macmillan Report on this and other points. In Chapter VIII he hopes for a revived World Economic Conference to reduce Tariffs, and for regenerated politicians to scale-down war obligations, though in both cases he is aware of the difficulties. The last chapter is a plea for the development of the B.I.S. into a World Central Bank. The Central Bank should aim at stability of an Index Number of Wholesale Prices. There is no mention of the difficulties of such international co-operation in a world in which geographical specialisation is still very marked.

Mr. Puxley writes well and knows how to support his arguments with selected facts. Indeed, he has all the qualities of a pamphleteer—and this book is essentially a pamphlet.

R. S. SAYERS.

Essai sur le Gold Exchange Standard. By J-Y LE BRANCHU. Paris: Recueil Sirey. 1933. 270 pp. 35 fr.

M. Le Branchu has given us a book which is at once a historical survey of the Gold Exchange Standard and a discussion of its present position and future prospects. The pages on the system before the War are cursory but, on the whole, useful. The idea that the American member banks were on a Gold Exchange Standard because they had to make compulsory deposits with the Federal Reserve Banks, those deposits being withdrawable in gold, is strange and unconvincing. Throughout the book the author is careful to emphasise his idea that there is a great contrast between the pre-war Gold Exchange Standard and that of post-war days. Before the war gold exchange did not, whereas after the war it did, form part of the legal reserve against note issues. This distinction is inaccurate in fact, and nowhere does M. Le Branchu give it any significance.

In discussing possible alternatives to the Gold Exchange Standard, M. Le Branchu has little patience with the proposals of Irving Fisher and Mr. Keynes. Fisher's commodity standard is rejected, partly because Index Numbers have defects sometimes, and partly because with a commodity standard a rise in prices means a rise in the monetary value of the gold reserve, therefore an inflation of the note issue, therefore further price rises, and so on into the vicious whirlpool. There is only one fault in this delightfully simple argument—the author has forgotten (or misunderstood) his premises. Mr. Keynes receives even more summary treatment. His 1923 proposals are rejected in a few lines because the only weapon of control in his system would be Bank Rate, which (as our author repeats many times in the book) experience has shown to be imperfect. The imperfections of the Bank Rate method are, of course, difficulties in the way of any monetary policy whatever.

M. Le Branchu rightly attributes the post-war popularity of the Gold Exchange Standard to the threatened scarcity of gold (of which he has no fear) and to the difficulties of restoring monetary systems. But he does not like it. It lends itself to unjustifiable inflation. He looks forward to a revival of a gold circulation in France. It will not take much extra gold, he says, because there is so much hoarding in the country now. He also wishes to see a return to gold circulation in all the other leading countries, the gold exchange system being reserved for true colonies and for transitions from any unhappy falls from grace. The Gold Bullion Standard, he concludes, neither saves gold nor avoids the dangers of inconvertible paper. Indeed, M. Le Branchu is one of those who think that in monetary affairs hardly anything has been done aright since the war—and the Gold Exchange Standard has been one of the evil Genii. We have been living, he tells us, too much for the present, caring nought for the future. I suppose he thinks that we in this country have enjoyed twelve years of well-nigh continuous depression.

The book has certain technical defects. It is so loaded with quotations (many from Dr. Eisler) that it is sometimes difficult to know what the author himself thinks. It has far more than its French share of misprints. And why must many French writers mangle the names of English writers?

R. S. SAYERS.

An Introduction to the Computation of Statistics. By SHEPERD DAWSON. University of London Press. 1933. 192 pp. 10s. 6d. net.

A natural corollary to the publication of research papers is the assembling of results and methods of research in book form. One way of doing this, in statistics, is to get within the confines of a book a number of methods arranged in logical sequence with an appropriate description of the assumptions made before the mathematical analysis is attempted, and of the particular problem which was the subject of the original piece of research, together with the original illustration with the method applied. In this way reference to the originals, which may be irksome to fresh workers, is avoided. Another way is to cover a great deal more ground by leaving out a fair amount of the original work, that is, omitting much of the mathematical analysis and discussion of the basis of this analysis, as far as it refers to the original problem, and to concentrate on the result achieved with illustrations, perhaps of a different kind from the original, of the way these results are applied to a particular problem. This is the *modus operandi* of Dr. Dawson.

There are advantages in this second method of presenting these results. Obviously there are many persons who would like to be able to apply statistical methods of various kinds to problems in their own spheres of activity, and these persons quite likely are not sufficiently equipped with mathematical knowledge to be able to follow the analysis in the original papers. A book of this kind which concentrates on the practical application of these methods to specific problems should naturally be a help to this class. But there are dangers in this method of procedure. We are all aware of the danger which may result from taking a quotation from its context, and we must be alive to the fact that it may often definitely be dangerous to take a statistical result away from the initial argument and the mathematical analysis which precede it. There may be assumptions made in the original paper which are not justified in a special case to which a reader of Dr. Dawson's book may wish to apply a method therein described. Anyone therefore runs the risk of having his interpretations of statistical facts challenged if he relies only upon a knowledge of the derivation of the methods and their application from a book of this nature. It should be stated that reference is continually made to the sources from which the author derives his material, and anyone wishful to apply the methods described should consult these references in order to safeguard himself from the pitfalls which beset him.

The author sums up the position *re* statistical methods in his preface, " The calculation of statistics is a matter of mere arithmetic, and *the understanding of their general significance little more than common sense* " (our italics). How very true ! But how much is meant by the terms " little " and " common sense " !

E. C. RHODES.

An Industrial Survey of Cumberland and Furness. By J. JEWKES and A. WINTERBOTTOM. Manchester University Press. 1933.

The recent Government surveys of distressed areas were necessarily confined to the four chief industrial districts where the problem of surplus labour is of substantial magnitude. But these reports do not by any means tell the whole story. The Cumberland and Furness area presents—though on a smaller scale—an equally disturbing problem ; and Messrs. Jewkes and Winterbottom have performed a valuable public service in collecting the relevant facts concerning its plight.

The Survey area covers West Cumberland and Barrow-in-Furness, and excludes the Carlisle district. It has a population of a quarter of a million, dependent largely on iron and steel, coal and shipbuilding. The picture is one of practically unrelieved gloom. Half of the coal output is normally absorbed by the iron and steel industry ; between 1927 and 1930 the production of pig-iron fell by one-third and that of steel by one-half. The coal export trade depends chiefly on the Irish market, and this has been severely hit by the tariff war. Engineering and shipbuilding activity in Barrow-in-Furness has dwindled under the influence of the world depression, but it is at least comforting to note that these industries did show mild symptoms of boom up to 1929. The population of the area fell by 25,480, or 9 per cent., between 1921 and 1931; and the net loss by migration was, of course, greater. But, in spite of some adjustment in the labour supply, there was still a surplus of 9,000 males, or 17 per cent. of the total insured, in the "boom" year, 1929.

The volume is based mainly on unemployment insurance and population census figures. In analysing the net loss of population in Cumberland in the period 1871-1911, the authors state that "very little useful information appears to exist upon the question of the destination of this large and continuous outflow." This is, of course, true as far as statistical information in a finished form is concerned; but it would have been possible, by working on the figures of Cumberland-born people enumerated in other counties at each decennial year, to obtain an approximate idea of the direction of this outward movement.

The authors deplore the fact that the forces of the market are allowed full scope to condemn certain areas to extreme specialisation. They are of the opinion that the State should supervise the location of large industrial establishments and that, if the undertaking's expectation of life is limited by its dependence on a local wasting asset, a compulsory compensation fund should be accumulated, with the co-operation of the State, for financing the future transference and re-training of the workers.

Permanent changes in demand and technique must necessarily bear hard on some sections of the community. The basic problem is to deflect some of the fruits of increased productivity to the victims of the transition. Capitalistic society has not shown any striking success in coping with this problem and it is no wonder that the strait-jacket, to which the system has been forced to grow accustomed, is being continually tightened. The advantage which a section of the community will derive from State interference with the choice of location must be balanced against the loss due to an imperfect distribution of resources from the point of view of the entrepreneur. The economist cannot alone unravel this complicated problem of net advantages. Nevertheless, the intelligent citizen will go on asking these questions and the statesman will continue to carry out policies based on a rule-of-thumb answer to them.

BRINLEY THOMAS.

Insurance Funds and Their Investment. By F. W. PAISH and G. L. Schwartz. London: P. S. King & Son Ltd. 1934. x+118 pp. 4s. 6d.

The scope of this book is described accurately by its title—it deals with the types of investment suitable for business like fire insurance which is a year-to-year contract and for life assurance where the insurer receives a level premium for an increasing risk and must, therefore, build up reserves to meet an accruing liability. Broadly speaking, life assurance funds can be invested to a large extent in mortgages, reversions, ground rents, securities wthout a ready market, irredeemable stocks and so on while the relatively smaller funds of year-to-year insurance should be capable of easy realisation, as anyone who remembers the San Francisco conflagration and appreciates the possibility of catastrophe will admit. As the authors indicate, however, there has crept into life assurance a banking element that might lead to something like a " run on the bank "; this is due to the policyholders' right to surrender or borrow, and in some countries a high scale of guaranteed surrender values has accentuated the danger. The U.S.A., and to a lesser extent, Canada (where guaranteed values prevail in a way with which we are unfamiliar in England) have recently afforded a reminder of this. After discussing the attractiveness of theories of investment in ordinary shares the authors appear to conclude that they are not generally suitable as insurance investments, and they indicate that if an insurance company has liabilities in any currency there should be an appropriate investment reserve in the same currency. In other words speculation in "equities" and "currencies" is not the business of insurance.

With those general views we are in agreement—there are but few persons engaged in the practical administration of life assurance who would disagree.

There are, however, several details from which we should dissent, and though we mention a few of them it must be understood that they are subsidiary to the main treatise and that, after all, critics differ!

The first half of the book deals with general principles, the building up of an insurance fund and the valuation of life assurance liabilities—the last item being an example of excellent compression into less than five pages. In this first half there are many diagrams, some of which seem to add to the difficulty of the subject rather than help the explanation, Fig. 7 (A), p. 29, being specially unfortunate. The word " insurer " is used by the authors for "insured" instead of for the insurance company or underwriter, and this becomes still more difficult on p. 28 where both " insured " and "insurer" appear in the same paragraph, while the use of the terms " endowment insurance " for a pure endowment and " life endowment " for what is called endowment assurance in this country is unnecessarily confusing. On p. 48 the authors suggest that there is " in proprietary insurance companies . . . some definite conflict . . . between the interests of the existing with profits policyholders and those of the shareholders, for while the former are interested in maximising " (horrible word!) " profits per £100 of with profits policies in existence, the latter are interested in maximising total profits." This sounds plausible but bearing in mind existing practice and competition as well as the difficulty of building up reserves on an adopted basis for enlarged new business, it is difficult to see how arrangements would be made whereby the proprietors increased their share until some years had elapsed, and the sort of shareholder the authors envisage would want quick results. The suggestion is " mere theory "; so far as we can tell the implied danger neither exists in a practical form to-day nor has existed for many years past.

The second half of the book surveys insurance office investments and discusses currency depreciation and investment experience. An amusing touch occurs on p. 61 where the authors talk of the " stability " of a life assurance business meaning that the business has settled down to a more or less stationary condition! And then we come to a table formed directly from the aggregate figures compiled by the Board of Trade from statements deposited during the year 1931. Any reader without first-hand information or unable to refer to the returns would get a wrong impression from this table. The group " Loans on Public rates, municipal securities . . ." includes a large proportion of stock exchange investments and to count them with the mortgages in contrast with marketable securities would be incorrect. The ordinary stocks and shares held by the companies contain substantial holdings in reversionary investment companies controlled by certain insurance companies which do this class of investment through a subsidiary, and the effect of including such items is to make the interest of insurance offices in reversions and life interests appear too small. Similarly loans on life interests and reversions should be included in one group with life interests and reversions (see the Clauson Committee's report). The " ordinary " share group also contains the value of shareholdings in other controlled companies, some of which are set up or acquired merely as a convenient way of writing business abroad. The terms " Loans on Policies and Personal Security " does not give the ordinary reader the impression that to all intents and purposes the whole item is " Loans on Policies."

The discussion on the effect of currency variations is confined to the experience of this country and the U.S.A. except for a passing reference to Germany. Mention should have been made of the efforts by Continental insurance companies to mitigate the havoc that is produced by extreme currency variations. In different ways the Australian and the Canadian experiences are important.

The book is fundamentally sound and that makes it all the more regrettable that the reader is pulled up, perhaps twenty times, with an inexact use of a word, or a statement open to comment or a remark that irritates when it is written in a serious book though it would be forgiven in an evening paper.

The Bibliography is poor and there is no index.

W. P. Elderton.

The Tourist Movement. By F. W. Ogilvie. P. S. King & Son. 1933. 228 pp. 12s. 6d.

A tourist is defined as one who stays away from his permanent residence for less than a year and does not earn money while away. This covers touring within a country by residents as well as non-residents. Professor Ogilvie insists on the greater importance of the former, but since quantitative information on it is so scanty, his book deals mainly with the latter.

This plays a considerable part in the balance of payments of certain countries. In 1929 France had a net credit of £68 million and the

United States a net debit of £140 million under this head, and "the tourist trade is now Canada's largest export industry."

Professor Ogilvie discusses methods of measuring external movement, length of stay, and expenditure of tourists, and then applies them, in Part II, to the measurement of the tourist movement of the United Kingdom during the post-war years. He estimates that in 1929, for example, the total expenditure of visitors from abroad was over £22 million and that of United Kingdom tourists abroad nearly £33 million, giving a debit balance of over £10 million. He points out how comparatively easy it would be for the British Board of Trade to do what many other countries have done: to obtain data from which more reliable estimates could be made. Part III gives detailed accounts of the tourist traffic in eleven countries.

My enjoyment of the book was marred only twice. It was irritating to be told a second time about the Czechoslovakian trains (p. 15 and p. 155); and Professor Ogilvie's insistence that the main interest of his study is in indicating "the large place belonging to services as distinct from goods in the modern economy," seemed unconvincing and unnecessary. His work is scholarly and entertaining, and to increase our knowledge and at the same time maintain our interest is sufficient justification for any book.

F. BENHAM.

Principii di Economia Finanziaria. A. DE VITI DE MARCO. Guilio Einaudi, Turin, 1934. xxxii+425 pp. 40 Lire.

Grundlehren der Finanzwirtschaft. A. DE VITI DE MARCO. J. C. B. Mohr, Tübingen, 1932. xxviii + 324 pp. Marks 12.50 (paper), 15 (cloth). (Both contain a Preface by Professor Einaudi and a list of De Viti De Marco's publications.)

This is probably the best treatise on the theory of public finance ever written. In its more restricted sphere, it is comparable to the *Principles* of Marshall. Like the *Principles*, it is the product of many years' thought; like the *Principles*, it can be read again and again, and brings fresh illumination each time; but, unlike the *Principles*, it has not had the influence it deserves, except in Italy, where its effect has been profound, and possibly in Sweden.

The magnitude of De Viti De Marco's achievement is best perceived against the background of the treatment given to the science of public finance in England, and indeed in most countries.

Despite the fact that in most modern countries over a fifth of the national income is taken by the State in taxation, all equilibrium theorists omit the phenomena of public finance from their equations. Pareto mentions them. The part of income taken by the State, he says, is expended according to other rules, with which we have no concern. But this will not do. In the first place, the theory of equilibrium assumes that somehow law and order are maintained, and contracts enforced. In the second place, the demands of the State affect the prices of factors and goods within the circle of private activity. The problem of taking account of State activity cannot be solved by ignoring it.

Some economists illustrate the theory of value by analysing the effects of different kinds of taxes and bounties. They usually ignore the effects of the expenditure of tax receipts by the State, and treat the State solely as a *Zwangsapparat*, although the rest of their assumptions imply a freedom of action on the part of individuals usually found only in democracies. Their illustrations fall far short of a theory of public finance.

Most treatises on public finance are very inadequate. One of the chief questions they discuss is what are the best principles of taxation. Edgeworth could assert in 1925, and Professor Pigou more recently, that in this country, at all events, the principle of least aggregate sacrifice is generally accepted. The main defect of this principle is not that, like all such principles, it must be a value-judgment, nor that it implies that any given income yields the same utility to any person. Its main defect is that neither Edgeworth nor Pigou nor any other economist proposes to apply it: for to carry it out logically and completely would involve taxing the rich for the benefit of the poor until complete equality of incomes was attained.

The discussions of the effects of taxation are also unsatisfactory. Take as a leading example the usual discussion of a tax upon the output or sale of each unit of a commodity. The supply and demand curves are supposed to remain unchanged and equilibrium to be reached when the amount demanded at the new price equals the amount supplied at the new price less the tax. This isolation of one commodity from the rest of the economy is particularly unsuitable in discussing public finance. The conventional treatment tells us nothing of the transition from the pre-tax to the post-tax equilibrium; it tells us nothing on the important subject of the change in relative factor-prices due to the tax; it consequently ignores possible changes in the supply curve; it overlooks possible changes in the demand curve due to the repercussions of the changed incomes of those supplying the taxed commodity; and it usually leaves out the effects of the expenditure of the tax upon the demand for and supply of the taxed commodity.

Much of the writing on public finance is indeed, as Einaudi remarks in his preface to this volume, a hotch-potch of political and ethical opinions, discussions of statutes and of administrative considerations, facts and figures, and applications, often misleading, of economic principles or pseudo-principles. The best of it is usually a series of unconnected essays.

To turn from all this to the pages of the present volume is like turning from a Royal Academy exhibition into a gallery of Cézannes. De Viti De Marco gives us a consistent and unified theory of the part played by the State in economic activity. He evolves no " principles " from his inner consciousness. He makes no assumptions about absolute utility: his criticism of the usual case for progressive taxation is devastating. He analyses problems whose very existence most previous writers had not realised, such as the problem of whether a progressive income-tax is "self-frustrating," and the problem of why public debt might arise in a community in which State action was in harmony with the preferences of every citizen. He shows how State activity can be fitted into the framework of equilibrium theory. And he had shaped the main outlines of all this over thirty years ago; indeed, they are present in embryo in his *Il carattere storico dell'economia finanziaria*, published in 1888.

Space does not permit a summary of this important work, or even the reproduction of samples of his analysis (achieved without the aid of algebra or diagrams). I shall therefore conclude with a few criticisms.

The hopeless problem of attempting to define a significant and unambiguous " end " is evaded if we simply ask how one person would act in various situations, given his scale of preferences, or on what basis a number of persons could reach unanimous agreement about collective action to be taken on their behalf in different situations, given the scale of preferences of each of these persons. We thus get De Viti De Marco's two limiting hypotheses of the Absolute State and the Co-operative (*not* corporative) State. Nearly all his analysis relates to the latter. Einaudi, in his preface, is careful to insist that the Co-operative State *is* an hypothesis, but the reader is often puzzled as to whether De Viti De Marco is analysing what would happen under this hypothesis or is writing in terms of the real world. In this respect, the second part of Wicksell's *Finanztheoretische Untersuchungen* forms a good supplement to the present volume.

Similarly, the reader is left uncertain whether De Viti De Marco's assumptions lead to proportional taxation. His assumption that all citizens avail themselves of the " public goods " provided by the State, and that these goods are of an instrumental nature, assisting citizens to gain their incomes, suggests that taxation proportional to income is indicated. But he points out later that the State can charge discriminating prices for the " indivisible " services (public goods) which it provides or, one might say, that two persons with equal incomes might be prepared to pay different sums for the same objective service. Hence his stimulating discussion remains, perhaps deliberately, inconclusive.

His conception of collective wants seems unsatisfactory, although his footnote in reply to Pantaleoni shows that he had considered and rejected the objections to it. He contends that collective wants arise only when men live together: an isolated man needs, for example, no protection against thieves. But an isolated man wants to protect his possessions against wild animals or nature; doubtless his scale of preferences is changed if he lives in society, but surely the fundamental nature of his wants remains the same. The services which men would agree were better provided collectively by the State are services which yield indivisible benefits, or which for other reasons are more suitably provided by the State than by private entrepreneurs. The distinction, that is, resides in the nature of the service and not in the nature of the want which it satisfies.

Other points in the book are open to objections. The contention that an income-tax on gained income does not discriminate against saving, although ingeniously argued, cannot be accepted, and some of the monetary analysis in the section on "extraordinary finance" is dubious. But the work as a whole is monumental. The German translation is excellent. The lack of an English translation is a great misfortune and loss to all students of public finance in English-speaking countries.

F. Benham.

The Devaluation of the Pound. By J. L. K. Gifford. P. S. King & Son. 1934. viii + 114 pp. 5s.

Mr. Gifford's pamphlet is aptly entitled *The Devaluation of the Pound*, for the subject is the effects of the depreciation of the pound in the years 1931-3, and one of his main conclusions is that the pound should forthwith be relinked to gold at a level lower than the former parity. He has not been concerned at all with the events of the gold-standard years, 1925-31. Perhaps at times the reader feels that this limitation is responsible for the rare weaknesses in his arguments. But since a period of over two years has now elapsed since the gold link was broken, there is a prima facie case for toleration of Mr. Gifford's disregard of the preceding period.

" This book is designed primarily for the use of students," we are told in the Preface. For that use it appears to the present reviewer to be better adapted than at any rate most of the pamphlets which have been published recently in this field. For Mr. Gifford has devoted much of his space (e.g. almost the whole of Chapter II—nearly half the book) to a rigorous analysis of the considerations affecting international price relationships. In this analysis the author has shown a refreshing awareness of the various alternative possibilities at each stage (particularly e.g. on pp. 20-1). In the later stage of his work, the practical discussion of the " Effects of the Exchange Depreciation of the Pound Sterling " (Chapter III), his use of statistics is admirable. They are drawn from unquestionable sources and Mr. Gifford never claims more for them than is justifiable.

When these great advantages of the book are considered it is a pity that the author has allowed his heart to run away with his head occasionally. For example, in the midst of Chapter II, after an extremely able analysis, we are suddenly confronted (p. 48) with the statement (speaking of Great Britain) that " it was quite unnecessary to allow the exchange depreciation. It could have been avoided easily, on the assumption that the French Government was friendly, by the loan of about £m. 250 from the Bank of France and a strong statement from the British Government that it would maintain the gold standard at all costs." As to the former of these two weapons, it is extremely doubtful whether foreign bankers were willing to lend any more after the entire gold reserve had been pledged. As to the latter—the " strong statement " of policy—we must remind Mr. Gifford firstly that financiers are apt to think that strong statements only become necessary when the situation has become doubtful, and secondly that not only did we have " strong statements " in those days of 1931, but also a " National Government " was formed, with the wide support of public opinion, to maintain the gold standard. There is some further development of Mr. Gifford's criticisms in the first few pages of Chapter III; but nowhere does he quite justify his most extravagant remarks.

There are very few minor errors. To find " motives " for the depreciation of the South African pound (p. 68) seems superfluous, in view of the South African Government's well-known attitude at the time. The remarks about the yen depreciation (pp. 65-6) show lack of appreciation of the Japanese situation. The peculiar weakness of the Japanese currency was not due to " depreciation in 1927 " but to the fact that after accustoming her economy to the advantages of monetary independence by an exceptionally long period of gold export embargo, Japan tied her prices to world prices just at the time when everything was turning against her. Again, on p. 105, Mr. Gifford ignores the close dependence of the Japanese yen on the American inflation experiment (though at other times he has been aware of some contact).

These criticisms we have made must not, however, be allowed to obscure the fact that Mr. Gifford has written a pamphlet which merits a wide public. His analysis proves him to be an able economist who generally lives up to his own idea of the impartial position which the economist should maintain (pp. 34-6). When regard is paid to the fact that he has written in the heat of the struggle, the reader must admit that Mr. Gifford's backslidings have been extremely rare. It is unfortunate that his publisher should have chosen his few unreasonable assertions for reproduction on the dust-cover. Mr. Gifford deserves better treatment.

R. S. SAYERS.

Agriculture and the Trade Cycle : Their Mutual Relations, with Special Reference to the Period 1926-1931. By JOHN H. KIRK. London : P. S. King & Son. 1933. xiii+272 pp. 12s.

Mr. Kirk's book leaves the reader with an impression of very interesting and stimulating suggestions presented together with conclusions and generalisations which are based frequently on insufficient statistical data and sometimes simply on conjectural estimates. Of particular interest, however, to the reviewer is Mr. Kirk's idea that agricultural fluctuations operate at the critical moments of the trade cycle and determine the turning-points of the cycle. The author thinks that the fixed investment cycle and the working capital cycle may reasonably be regarded as explanations of the movement of trade within the limits of the cycle, but it is still necessary, he thinks, to understand what is occurring at the limits. He says that : " there is no specific time at which fixed investment re-emerges, and no specific urgency prompts it." He continues further : " the quantity of investment that will be undertaken is a quantity depending not alone on the rate of interest and the true earning power of the projects, but also upon the state of confidence." In his opinion, these subjective states are themselves products of real causes such as inventions, harvest conditions, and so on.

It has always been the opinion of the reviewer that prevailing theories which consider the trade cycle as a self-generating phenomenon cannot satisfactorily explain the initiation of a new cycle, a revival after depression.[1] For this reason we welcome the pluralistic point of view of Mr. Kirk, particularly his attention to agricultural fluctuations and their role in the trade cycle. We agree with him, also, that not only inventions or wars may be considered as factors initiating trade cycles, but also " some less spasmodic occurrences connected with agriculture."

But the reading of Mr. Kirk's book produces an impression that the author is not quite clear about the phenomenon of the agricultural cycle itself, to which he assigns so great an importance in the explanation of the timing of trade cycles. On the one hand, he emphasises the short-term cycle in agricultural output—he calls it a three-year cycle; on the other hand, when he explains this short-term cycle, he emphasises mostly those factors which explain the agricultural crisis, the main characteristic of which is its long-term period (if any). This inadequate distinction between two quite different phenomena—short-term variation in agricultural output and the agricultural crises occurring at long intervals—may explain to some degree several misleading conclusions at which Mr. Kirk arrives.

Directing his attention to the relationships between agriculture and trade during the present depression, when world agriculture has been in one of the periods of continued crisis, he tries to generalise them as characteristic of the relationships between trade and agriculture in a typical trade cycle. In the earlier chapters of his book he discusses such problems as the inelasticity of supply of agricultural products and of the demand for them, the rigidity of the distribution costs for agricultural products, and he explains very well how these characteristics of agricultural economy were responsible for the present agricultural crisis. But in later chapters of his book (Chapters VIII and IX) he tries to apply the same factors to the explanation of the short-term fluctuations of agricultural production.

The short-term fluctuation of crop production, the cyclical character of which he recognises, even emphasises, he explains not by climatic factors, but by variation of agricultural output under the stimulus of preceding prices. An argument for such an explanation, in his opinion, is the fact that it is relevant also to cycles in animal production, to which he assigns considerable importance. There is no question that the reaction of farmers to variations in prices is responsible for the cyclical character of fluctuations in output in some branches of agriculture, particularly in the animal industry (hog cycle, cattle cycle, horse cycle, and so on). But these cycles are of greatly varied periods (a four-year hog cycle, and perhaps a fifteen-year cattle and horse cycle), and they must be classified mostly as long cycles. They can hardly explain the short-term cycle in the total agricultural output, dominated by crop fluctuations. What appears to Mr. Kirk to be a reaction of farmers to price changes, as their adjustment to a changed level of prices, is, in most cases, simply a next change in crop production, because of the change in yield under the influence of climatic factors. If there is a certain cycle in the variation of yield and the price variation reflects this cycle, the later phases of the cycle in output may seem to be produced as a reaction to the price changes, while in fact it is no such reaction at all.

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[1] See the study of the reviewer: " The Rôle of Agricultural Fluctuations in the Business Cycle," *Michigan Business Studies*, Vol. II, No. 9, 1930 (Ann Arbor, University of Michigan, pp. 62-5).

Statistics show that cyclical fluctuations of crops are more peculiar to regions of extensive forms of agriculture, such as Russian and American small-grain regions. It would be natural to expect that in the regions of extensive agriculture the reaction of farmers to price variations would find its expression in the expansion or contraction of the crop area. However, statistics show that there is no marked correlation between crop areas and preceding prices (except perhaps for a few crops such as cotton in America). The cycles in crop output reflect more variation in yield than in acreage, and variation in the yield in the regions of extensive agriculture respond more to climatic variations than to changes in the intensity of cultivation. The intensive forms of cultivation, particularly the use of fertilisers, are not known at all in those regions most affected by cyclical variations in crops. Pre-war Russia, with its peasant farming only slightly dependent on markets and for this reason affected only slightly by changes in market prices, knew the strongest short-term cyclical variations of crops. For these reasons, the role of climatic factors in the explanation of the short-term cyclical fluctuations of crops must be much greater than Mr. Kirk supposes it.

The inelasticity of demand for agricultural produce plays an important role in Mr. Kirk's explanation of the agricultural cycle itself as well as in the explanation of its relationship to the trade cycle. Basing his argument on a purely conjectural estimate that the elasticity of demand for agricultural produce (at wholesale prices and in the world market) is as small as 0·6, he concludes that a typical amplitude in the fluctuation of agricultural supply of 10 per cent. must produce a fluctuation in prices of 20 per cent., and, consequently, the fluctuation in total receipts for agricultural products of 12 per cent. in a direction opposite to the fluctuation of the supply (see pp. 177-8 and 208).

It is thus evident that Mr. Kirk does not accept the conclusion of Professor Pigou that the pre-war elasticity of demand for American farm products was greater than unity. His sketchy comments on the elasticity of demand for several agricultural products given in Appendix III conclude with the statement that " the demand for agricultural produce is predominantly inelastic." But this statement refers to *the demand of* *ultimate consumers at retail prices.* We may challenge this statement, referring in support of our objection to the authority of American researchers such as Professors G. F. Warren and F. A. Pearson. Summarising their detailed study—" Inter-relationships of Supply and Demand "—they conclude: " Consumers pay more for a large crop than for a small crop. Farmers receive less total dollars for a large crop than for a small one. The extra amount paid by consumers remains in the cities " (p. 143). Thus, their conclusion is that the demand for agricultural products in America by ultimate consumers is elastic. In my above-mentioned study, I have shown that the demand for agricultural products for export from America is elastic; in the years of large crops and low prices agricultural exports from America were always larger and more valuable. There is sufficient statistical evidence, therefore, that for long periods of time (before the war and since), the total value of crops at prices paid by domestic consumers or exporters is larger with larger crops even for exporting agricultural countries such as the United States. The national value product to which the fluctuation in crop receipts is relevant (including in this not only receipts of farmers but also of distributors) fluctuates in direct correlation with usual variations of the crop output and not in an inverse relation as Mr. Kirk concludes. He bases his conclusion upon an exaggerated estimate for the inelasticity of demand and upon the unusual condition peculiar to the present agricultural crisis.

For these reasons, the relationship between the trade cycle and the agricultural cycle seems to be inverse to that suggested by Mr. Kirk's analysis. According to his theory, bumper crops, because of inelasticity of demand, must affect purchasing power of agriculture downward (understanding agriculture in the larger sense, including at least primary distributors). However, business annals (at least in America and Russia) reveal that years of good crops with low agricultural prices usually precede revivals of business or are coincident with such revivals.

On the other hand, Mr. Kirk tries to mitigate the most important factor connecting the agricultural cycle with the trade cycle; namely the fact that abundant harvests reduce the cost of raw materials and provide manufacturers with a greater margin for their profits. He concludes his analysis with the statement: " The importance of fall in the prices of agricultural raw materials due to increased supply is small in the matter of inducing extra activity among the users of them " (p. 157). Moreover, accepting an exaggerated estimate of the inelasticity of demand for agricultural products and assuming that the demand for other products is comparatively inflexible, Mr. Kirk concludes that the principal repercussion of the fluctuation of agricultural prices and receipts of agricultural communities " consists in the savings which are made by the consuming public when their agricultural produce bill is smaller, and conversely " (p. 180). And further, he says: " These savings, which withdraw purchasing power from the market, cause equivalent losses." On pp. 45-7, Mr. Kirk tries to substantiate this theory by slight statistical evidence that savings and food prices varied inversely in Great Britain during the recent period. It seems to us that in this case, as in several others, Mr. Kirk tries to conclude from a relationship characteristic of the present period of agricultural crisis, with the unusual decline of agricultural prices, that the existence of such a relationship is usual between the short-term fluctuations of agricultural output and the trade cycle.

Mr. Kirk's suggestion that the most important single connection between agriculture and trade is perhaps via the investment activity of the developing countries, whose credit and incentive to develop vary with their agricultural receipts (p. 194), we consider quite correct and very interesting. It seems to us that Mr. Kirk is right to emphasise the importance of changes in the investment of foreign capital in agricultural countries during the recent decade as one of the factors explaining the changes in the post-war business situation throughout the world. We pointed to this fact in our recent study, *World Agriculture and the Depression*. But following Mr. Kirk's theory, the periods of prosperity in agricultural communities would generally coincide with the periods of high agricultural prices caused by a small supply of agricultural products. Against such a generalisation we would energetically object, because history shows that investment in agricultural countries, particularly "booms" in railway construction, generally follows periods of good crops.

It is regrettable that Mr. Kirk, as he states in the preface to his book, had not sufficient time to continue his quantitative analysis of the relationship between agriculture and the trade cycle, using for this analysis existing statistical data which are not so scanty, but many of which were not known to him. In most cases, his quantitative analysis, which he prefers to a qualitative one, is purely conjectural, which means that many of his conclusions are not sufficiently founded on facts and that they must be substantially revised.

V. P. TIMOSHENKO.

Manuele di Statistica. Introduzione allo Studio Quantitativo dei Fatti Sociale. By FELICE VINCI. Nicola Zanichello, Editore, Bologna. 1933. Two Volumes, 225 and 286 pp.

This is a complete introductory thesis on statistical methods, as used in the interpretation of economic or social phenomena by the well-known Professor of Statistics at Bologna. Part of its value is due to the fact that in many cases illustrations are taken from Professor Vinci's own work. Since, however, the volumes will only be of use to the small number of readers who can follow moderately advanced mathematics in clear Italian, and since, as is necessarily the case in a general thesis, the great part of the analysis is not original and is accessible in English or American books, it would be out of place to consider the treatment in detail. It may be said that the principal formulæ in modern use are clearly and accurately described, and enough examples are given to make their application intelligible. Where complicated mathematical proofs are necessary, the reader is usually referred to some other book where they are to be found. In some respects, however, the subjects treated are not so easily to be studied elsewhere. The chapters relating to interpolation and its application to Life Tables and generally to demographic questions (Part 1, Chapter IV, and Part 3, Chapter II) are of considerable utility. Also in the approach to the theory of probability at the beginning of Part 2 a good deal of attention is given to the methods of Bernoulli, Laplace, Poisson, and Lexis, which are not readily found in English works. Unfortunately the writer tends to devote so much attention to these theories relating to " attributes," that he does not develop any theory of " variables "; there is no reference to Edgeworth's development of Laplace's theories, which lead to the principle of the normality of the distribution of the arithmetic average, which is fundamental in the practical assignment of the trustworthiness of a sample of measurable quantities.

In fact the section on Probability is rather awkwardly placed between chapters which deal with various applications of statistical methods which are unrelated to it.

Useful numerical tables are given at the end of each volume; and attention may be called to the dated list of the older writers on Statistics to be found in Volume I, pp. 213-15.

A. L. Bowley.

Wages, Cost of Living and National Income in Sweden, 1860-1930. By the Staff of the Institute for Social Sciences, University of Stockholm.

Volume I, *The Cost of Living in Sweden, 1830-1930.* By Gunnar Myrdal.

Volume II, *Wages in Sweden, 1860-1930.* By Gösta Bagge, Eric Lundberg and Ingvar Svennilson. Part 1, " Manufacture and Mining."[1] Printed in Sweden, 1933. London, P. S. King and Son. 1933. 251 and 579 pp.

The Institute of Social Sciences at the University of Stockholm has now for some years been engaged on a far-reaching series of investigations that will cover many aspects of social and economic problems. The two volumes before us are to be regarded as the forerunners of the results of this series. The work is evidently in the hands of very competent sociologists and statisticians, who will carry on the high traditions of Swedish statistics, inform the inhabitants of that country of their own history and present conditions, and provide very interesting economic and demographic material for students all over the world. The fact that the publications are in English shows that the Institute considers them of much more than local interest.

Official figures of the variation in the cost of living in Sweden are available only from the year 1903. It was desired to study the movement during last century, and it was found possible to make comparable series from 1830; comparable, that is to say, with each other, for the method differs radically from that of modern retail price index numbers. After a very careful discussion of the most suitable material it was decided to use semi-wholesale prices, that is such prices as a retailer pays to a wholesale merchant. In the earlier part of the period at least most manufacture of food and clothes, except among the minority of town-dwellers, was carried on domestically, the raw materials being purchased in fairly large quantities. Adequate series of such prices in many districts were found after much patient research. These series are combined by means of series of weights obtained from estimates of national consumption. After a good deal of experiment it was verified that the choice of weights made very little difference to the course of the final series, and—a result of great importance—that the series agreed closely with the official cost-of-living index during the years for which they were both compiled. They also run closely parallel with Dr. Åmark's index of wholesale food prices. It must therefore be admitted that an adequate index of the general cost of living of the working classes in the country as a whole is available for a hundred years. There is an interesting discussion of the increasing regularity of prices in successive years and increasing uniformity through the country in the latter part of last century.

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[1] Part II, " Government Service, Agriculture, etc., and General Summary " is not yet available in London.

Nevertheless the caution given in the introduction is apposite: " It should be frankly recognised that we are here operating with vague and approximate generalisations about very ambiguous conceptions not definable in strictly logical terms and that this characteristic of a cost-of-living index number is due not only to statistical defects but also to the necessary theoretical vagueness of the problem."

The study of wages in the second volume proceeds on the same lines of critical choice of a limited amount of data and testing the results again and again by comparison with whatever more general material could be found from time to time. The method adopted was to follow the actual earnings of selected individuals, as shown in the books of selected employers over short series of years and to combine them by the " kinetic method " into coherent series over long periods. Everything here depended on the adequacy of the choice and method of combination, for the figures at the beginning are based on the earnings of only 160 separate workers and the number never exceeds 1,000. Very full information is given about the data and the way in which they are worked up. The reliability of the result can only be admitted because of the continual cross checks which in every case are satisfactory. The whole procedure is novel and of considerable importance in statistical method.

The earnings are purged of complete unemployment, but include receipts from overtime and are not raised to compensate for short time. The averages make no allowance for any relative changes in the relative importance of industries or of occupations within an industry. The series thus appears to represent the changes in earnings for work of an unchanged character. Perhaps when the data for agriculture are brought into account attention will be given to the effect of variations in number on general average earnings.

The very great increase in both real and money wages decade by decade through the period covered is indicated in the following abbreviated table. In consequence of considerable reductions in the weekly hours of work since the year 1890, hourly earnings are found to have increased more rapidly than have annual.

Earnings of Adult Male Workers in Manufacture and Mining

1913-14=100

Year	Nominal		Cost of	Real	
	Annual	Hourly	Living	Annual	Hourly
1861	32	28	85	37	33
1871	39	35	84	46	42
1881	49	45	91	54	50
1891	56	51	84	67	62
1901	70	69	85	82	82
1913	100	100	100	100	100
1920	287	362	268	107	135
1930	220	267	165	134	163

From 1913 the statistics are from already-known official statistics. Between 1913 and 1930 the nominal annual earnings of women increased 149 per cent., as compared with 120 per cent. for men.

A. L. Bowley.

British Public Expenditure, 1921-1931. By Joseph Sykes. P. S. King & Son, London. 1933. xii+388 pp. 15s.

This is a useful work of reference, which brings together much information concerning public expenditure, hitherto scattered through many Government publications. Mr. Sykes, I think, has read all the Blue books. He promises us another book on the theory of the matter, which—the literature in this field being still very scarce—will be awaited with interest. Meanwhile, he supplements statistics and narration with some preliminary notes on the effects of policy.

He conveniently groups together national and local expenditures on similar objects, and endeavours to pursue the consequences, both on distribution and on production, of all manner of spendings and tax-gatherings. On many of these there is really very little to be said. Even in such cases, however, Mr. Sykes prefers cautious speech to silence. " Nor may it be going too far to suggest that pensions to benefit orphans may further have improved economic efficiency by the better chances afforded to victims of circumstances to realise their potential capacity " (p. 226). He is equally cautious on more burning issues, such as the influence of unemployment benefit on wage rigidity; " if then, the negative arguments are not so strong, it is possible to suggest, with more probability of accuracy than not, that the affirmative arguments are relatively strong " (p. 247).

None the less, Mr. Sykes keeps his eye pretty steadily on the more interesting transfer problems in public finance—between richer and poorer, between older and younger, between the passive and active elements in society. He makes some ingenious, though as he admits rough and hypothetical, efforts to balance the incidence both of taxes and receipts, of burdens and benefits, between income classes. Thus he calculates (p. 320) that the richer section of the community in 1913 paid 63 per cent. of the taxes and took 49 per cent. of the benefits, and in 1921-31 paid 70 per cent. of the taxes and took 51·5 of the benefits. (" Richer " is here defined as being " above the highest wage income ").

Mr. Sykes ends with a series of practical suggestions. " The lessening of social and individual inequality has had profound effects of a highly favourable character " (p. 370). But many reductions are advocated, in the rates of war pensions, in civil service administrative staffs, in " the wastage observable in stationery and printing " (p. 372), in teachers' salaries, in social service benefits, in the wages paid by local authorities, in " imports destined for purely private consumption by social service beneficiaries, wage earners and pensioners " (p. 380), and in the taxation of company reserves.

This programme of action was compiled during the financial year 1932-3. It was based " on the assumption that the deflation of prices is not likely to be offset in the more immediate future by an inflation of prices " (p. 371). Fate has been more kind to the present Chancellor of the Exchequer than to force him to propose such a programme as this.

I should add, in conclusion, that Mr. Sykes's book has an unusually good index.

HUGH DALTON.

Books Received

A. H. Abbati : *Economic Readjustment in 1933*. P. S. King. 102 pp. 6s.

M. A. Abrams : *Money*. Twentieth Century Library. 127 pp. 2s. 6d.

Annals of the Royal Statistical Society, 1834-1934. The Royal Statistical Society. 308 pp.

A. Fenner Brockway : *Will Roosevelt Succeed?* Routledge. 248 pp. 6s.

G. D. H. Cole : *Studies in World Economics*. Macmillan. 285 pp. 12s. 6d.

H. Dalton, Brinley Thomas, J. N. Reedman, T. J. Hughes, W. J. Leaning : *Unbalanced Budgets*. Routledge. 468 pp. 15s.

P. H. Douglas : *The Theory of Wages*. Macmillan. 639 pp. 20s.

John A. Drossopoulos : *Report for the Year 1933 of the Governor of the National Bank of Greece*.

Paul Einzig : *The Economics of Rearmament*. Kegan Paul. 179 pp. 6s.

Paul Einzig : *Exchange Control*. Macmillan. 195 pp. 7s. 6d.

Amintore Fanfani : *Cattolicesimo e Protestantesimo nella formazione storica del capitalismo*. Vita e Pensiero, Milan. 159 pp.

C. R. Fay : *Imperial Economy and its place in the Formation of Economic Doctrine*. Oxford University Press. 151 pp. 6s.

P. C. Ghosh : *The Theory of Profits*. University of Calcutta. 442 pp.

W. Hamilton Whyte : *Decasualization of Dock Labour*. Arrowsmith. 127 pp. 5s.

E. Hantos : *Memorandum on the Economic Problems of the Danube States*. Mitteleuropa Verlag, Berlin. 27 pp.

Paul de Hevesy : *Le Problème Mondial du Blé*. Félix Alcan, Paris. 293 pp. 30 fr.

The House of Mitsui. Mitsui Gomei Kaisha, Tokyo. 74 pp.

Charles N. Hulvey : *The Mathematics of Finance*. Macmillan. 306 pp. 12s. 6d.

Walter Huppert : *Geldwirtschaft*. Duncker & Humblot, Munich. 31 pp.

J. Johnson : *The Nemesis of Economic Nationalism*. P. S. King. 116 pp. 4s. 6d.

J. M. Jones, Jr. : *Tariff Retaliation*. University of Pennsylvania Press. 352 pp. 12s. 6d.

H. Levy : *Science in an Irrational Society*. Watts & Co. 82 pp. 2s.

C. A. Macartney : *Hours of Work and Employment*. League of Nations Union. 94 pp. 6d.

D. J. MacGregor : *Enterprise Purpose and Profit*. Oxford University Press. 200 pp. 8s. 6d.

A. De Viti De Marco : *La Funzione della Banca*. Einaudi, Turin. 111 pp.

Karl Menger : *Moral, Wille und Weltgestaltung*. Julius Springer, Vienna. 143 pp.

Robert Michels : *Umschichtungen in den herrschenden Klassen nach dem Kriege*. W. Kohlhammer, Berlin. 133 pp.

Hugh Munro : *The Production of Money and its effect on Industry*. George Souter, Dingwall. 19 pp. 1s. 6d.

A. I. QURESHI : *The Farmer and His Debt.* The Indian Rural Reconstruction League. 102 pp. 2s. 6d.
F. A. REPACI : *La Finanza Italiana nel Ventennio, 1913-1932.* Einaudi, Turin. 314 pp.
BRUNO RICHTER : *Das Wesen des Wechselkurses.* Duncker & Humblot, Munich. 122 pp. Rm. 5.
R. N. RUDMOSE BROWN : *The Principles of Economic Geography.* Pitman. 208 pp. 6s.
P. SCHWOB : *Une Expérience Américaine.* Recueil Sirey, Paris. 197 pp.
RICHARD VON STRIGL : *Kapital und Produktion.* Julius Springer, Vienna. 247 pp. Rm. 7.80
F. W. TAYLOR : *The Economics of Advertising.* Allen & Unwin. 245 pp. 7s. 6d.
P. J. THOMAS : *The Problem of Rural Indebtedness.* Diocesan Press, Madras. 68 pp.
S. EVELYN THOMAS : *The Rise and Growth of Joint Stock Banking.* Pitman. 689 pp. 20s.
ARNALDO VOLPICELLI : *Corporativismo e Scienza del Diritto.* Sansoni, Florence. 202 pp.
JAMES P. WARBURG : *The Money Muddle.* Routledge. 274 pp. 7s. 6d.
HAROLD M. WATKINS : *Coal and Men.* Allen & Unwin. 460 pp. 18s.
KNUT WICKSELL : *Lectures on Political Economy.* Vol. I. *General Theory. With an Introduction by Lionel Robbins.* Routledge. 299 pp. 8s. 6d.

PUBLICATIONS OF THE LEAGUE OF NATIONS

Commercial Banks, 1925-1933. Allen & Unwin. 336 pp. 10s.
The State and Economic Life. Allen & Unwin. 411 pp. 15s.

Periodicals Received

L'Actualité Économique. Montreal. April, May, 1934.
Annali di Statistica e di Economia. Geneva. Vol. II. 1934.
Commercio. Rome. April, May, 1934.
Economia. Rome. March, June, 1934.
Economic China. Tientsin. March, May, 1934.
El Trimestre Economica. Mexico. Vol. I, No. 1. 1934.
Giornale Degli Economisti. Milan. March, 1934.
Indian Journal of Economics. Allahabad. January, April, 1934.
Journal of the Ministry of Agriculture. May, July, 1934.
Journal of the Royal Statistical Society. June, 1934.
Manchurian Economic Review. Harbin. June, 1934.
Revista de Ciencias Economicas. Buenos Aires. February, March, April, 1934.
Revista de Economia y Estadistica. Mexico. April, May, 1934.
The South African Journal of Economics. Johannesburg. March, 1934.
Währung und Wirtschaft. Berlin. April, May, June, 1934.

School Notes

GOVERNORS

Mr. R. B. Fraser and Mr. Harold Raynes, F.I.A., have been co-opted members of the Court of Governors and the Council of Management as representatives of the London County Council.

Professor R. S. T. Chorley has been elected by the Professorial Council to serve upon the Court of Governors in the stead of Professor L. Rodwell Jones, who retires by rotation.

STAFF

The title of "Emeritus Professor of Ethnology in the University of London" has been conferred upon Professor C. G. Seligman, who held the part-time chair of Ethnology at the School from its establishment in 1913 until his retirement in July, 1934.

Dr. A. Meyendorff, Reader in Russian Institutions and Economics in the University of London, who has been associated with the School since 1920, retires as from July, 1934.

From December 31st, 1934, the Sir Ernest Cassel Chair of International Relations tenable at the School will be discontinued, and a University Chair of International Relations (also tenable at the School) will be instituted in its place. Professor C. A. W. Manning has been appointed to the new Chair.

The title of "Reader in Anthropology in the University of London" has been conferred upon Dr. Raymond Firth.

The following members of the Junior Academic Staff have been recognised as teachers of the University:

Mr. D. J. Llewelyn Davies, M.A., LL.B., in Law;
Mr. D. Seaborne Davies, M.A., LL.B., in Law;
Mr. N. Kaldor, B.Sc. (Econ.), in Economics (Probationary).

Mr. D. W. Brogan leaves the School to become Fellow and Tutor of Corpus Christi, Oxford.

As a result of discussion with the visiting Members of the University Grants Committee, it has been decided to revise the grading of the Junior Teaching Staff better to accord with the nature of the work done by the teachers concerned. Teachers now bearing the title of "Assistant Lecturer" are to be re-graded as Lecturers; Assistants will be given the title "Assistant Lecturer" or "Tutor."

APPOINTMENTS TO THE STAFF

Professor Hermann Kantorowicz, formerly of the Univerity of Kiel, will become a part-time lecturer at the School in the session 1934-35.

Miss Audrey I. Richards, M.A., Ph.D., has been appointed assistant lecturer in Anthropology.

AWARD OF STUDENTSHIPS FOR POSTGRADUATE RESEARCH

Leverhulme Research Fellowships have been awarded to the following former students of the School: E. E. Evans-Pritchard, for research into "A detailed ethnological and sociological study of the pagan Galla of Western Abyssinia," and Miss Margaret M. Green, for research into "Anthropological and linguistic research among the Ibo tribe of Southern Nigeria."

A grant has also been made to Mrs. Nancy M. Windett for research into "The economic relations between the British Dominions and the United Kingdom."

A Research Studentship of the value of £200 a year in addition to fees, tenable for two years, will be awarded by the School in October, 1934, in the event of candidates of sufficient promise presenting themselves. Candidates are asked to submit either published work, Prize Essays, or written work bearing their names, or a detailed scheme of research on the subject proposed for investigation. Forms of application may be obtained from the Secretary of the School and should be completed and returned not later than September 12th.

A Metcalfe Studentship of the value of £100 for one year is offered for award by the University of London in September. The Studentship is tenable at the School and is open to any woman student who has graduated in any University of the United Kingdom. Further particulars and application forms can be obtained from the Academic Registrar, University of London, S.W.7, by whom applications must be received not later than September 1st.

Capital and the Heritage of Improvement

By Edwin Cannan

By the heritage of improvement I mean the net economic advantage which we and other generations who come late in the history of mankind, possess in consequence of what has been done by mankind in the past. I say the net advantage rather than the advantage simply, because some of what has been done in the past is no advantage, but a disadvantage to us; and I speak of the heritage of improvement rather than the heritage simply, both for that reason and because heritage alone might be taken to include the natural unimproved world which Man, perhaps with undue presumption, traditionally holds to have been created in order to be possessed by successive generations of his species.

Much of the difficulty of economic science in our day arises from the fact that the " political economy " of the eighteenth and nineteenth centuries tried to explain a very elusive thing, namely national economy, and also something wider, namely the economy of isolated society or mankind at large, by beginning with individuals in the existing conditions and then combining the individuals into " the nation " or " society " without ever trying to work backwards from society to the nation and the individual. Thus, in regard to capital and the heritage of improvement, the economists worked outwards from the individual to the nation and society, rather losing interest as they went, without testing results by working backwards from society to the individual, and the consequence has been that capital, unduly glorified, has been allowed to usurp the place which should properly be occupied by the heritage of improvement, to the great detriment both of economic theory and of public policy.

A characteristic of Man which seems to divide him from the other animals is a certain flair for improvement. The other animals will alter their habits and alter the materials used in the construction and furnishing of their houses—which we call their " nests "—to suit changes of environment ; but they do not seem to have any capacity for adopting, as time goes on, better methods and securing greater quantity or better quality of things which they require to satisfy their needs. Man alone seems, for the most part at any rate, to possess the power and the will to improve himself and make his surroundings more suitable for his purposes from age to age.

The heritage of improvement which is handed on from each day to the next may, perhaps, be classified under three heads, as follows :

First comes the knowledge and skill produced by research and experience, and transmitted from each generation to the next by books and other instruments, by oral instruction and by mere imitation.

Secondly, the organisations of various kinds which enable large numbers of people, practically the whole of mankind alive and adult at the same time, to co-operate in production.

Thirdly, such man-made alterations in the arrangement of matter as have made the outer crust of the earth more suitable for our needs, and have given us buildings, machinery, and such other man-made objects as are still useful.

Possibly we should add to these three heads a fourth, for improvements in Man himself, but as there may be some doubt whether Man has been improved, and as the three heads are sufficient for our present purpose, I will not add it.

That the heritage of improvement has not grown at all times and places ever since Man came on the scene is very probable. But that it has grown in most of the world during the " history of civilisation " I think nobody will be inclined to deny. Nobody really doubts that it is greater than when our remote predecessors regarded Wookey Hole as a delectable habitation.

Belief that the heritage has grown implies that we have some capacity for appreciating its magnitude. The standards of measurement which we apply to material things, like coal and water, are clearly inapplicable. We cannot measure the heritage of knowledge and organisation in tons or cubic feet at all, and the weight of steam-engines and the cubic capacity of factories would be very unsatisfactory information about the magnitude of the aggregate of these things as part of the heritage. The fact seems to be that we measure what we perhaps mistakenly call the magnitude of the heritage by estimating its importance in regard to our economic condition.

This importance is a compound result of the whole which cannot be arrived at by any adding up of either the parts of the whole itself or the separate results of the existence of the parts. Taken separately, the parts have no results; they are parts of one machine, and you cannot add the effects of the boiler of a steam-engine to those of the piston. We must simply estimate the importance of the whole heritage by our general impression of what the numbers and condition of mankind would be without it. If we think that the numbers would be much smaller and the condition much worse, we may be content to say it has grown.

The tendency to improvement is so deeply implanted by the existence of memory that we cannot suppose that the absence of desire for improvement would completely stop it. Unsolicited experience would teach us something which we could scarcely forget in the way of reaching our ends, and then, unless we resolutely declined to use these means, we should be obliged either to produce more goods or to have more leisure. But only a part—perhaps we may safely say, only a small part—of the heritage comes to us as the result of unsolicited experience in this way. The rest is produce of labour, and we can make this part larger or smaller according as we choose to devote a larger or smaller proportion of our labour to it.

We might, on the one hand, content ourselves with the barest necessaries of life, and work as long as possible at the improvement of the heritage ; or we might adopt the maxim, " eat, drink and be merry, for to-morrow we die," and give no time at all to that purpose.

None except some religious ascetics, and in their severer moments some too frugal Scotch economists, ever thought of recommending the first of these extremes. If the principle of bare necessaries is to be adopted only for a time, the recommendation can be disposed of by the simple question, " At what point of time is it to be given up ? If our great grandchildren are to abandon it, why may not we ? " If it is put forward to be followed for all time, it can be disposed of by the question, " Why improve, if nobody is ever to have more than the barest necessaries of life ? Is the ideal merely, as J. S. Mill put it, a human ant-hill ? "

The other of the two extremes is open, in the first place, to the objection that we do not expect to die to-morrow, nor even, when in reasonably good health, at the date which may be inferred from a table of " average expectation of life " at various years of age, so that even if we were purely selfish we should find difficulties in the policy. If we were all able to buy life annuities, these might be got over. But in fact we are not purely selfish, but are sufficiently altruistic or "race-conscious" to be willing to sacrifice something for the good of posterity, although, as the cynic said, "Posterity has done nothing for us."

Good economy from the point of view of the human race as a whole, spread over indefinite time, clearly requires our course to be laid somewhere between the two extremes. There must be a point somewhere at which, if we had all the necessary information, we could say the gain in the future will be only just enough to balance the loss in the present. But to be at all positive about the exact position of this point at any time is quite absurd. How absurd, will be appreciated if we consider that we cannot even say whether our predecessors fell short of, or went beyond the required point. We do not now censure "savages" for their "improvidence," and grumble that our uncivilised ancestors did so little for us. They might have done a little more perhaps, but they did a great deal; they led on the whole very hard lives, and we will not grudge them their little luxuries and recreations. Nor are we inclined to allege that they deprived themselves of too much; we really do not know. But we have much more information about the past than we have about the future; if we cannot pass any confident judgment on the conduct of our predecessors, still less can we confidently acquit or condemn our own conduct in this matter. Where the ideal point will lie depends largely on the number of people to be provided for. We know almost exactly how many persons will reach school-leaving age and marriageable age in the next few years, and so we have some knowledge of what schools and houses will be required for those few years, but that is almost all. We dispute with acrimony about what roads will be required ten years' hence, and who can say how much, if any, machinery for making synthetic wool will be required thirty years from now? We can only make wild guesses at most of the requirements of even a fairly near future, to say nothing of a really distant one.

Moreover, the question is complicated by the fact that we have not settled in our minds how much weight we are to attach to numbers of people. If what we want is rich people, no matter how few they are, and we and our successors restrict numbers, the ideal point will be in a different position from that which it will occupy if we want large numbers of people and take steps to create them. More houses and more of everything else except contraceptives will be required for the larger population. And further difficulty is introduced by the fact that the burden of providing for the future cannot be assumed to be spread evenly over the whole population, and the same thing is true of the benefits resulting. More provision for the future in imperial Rome might have meant fewer, or smaller, feasts by wealthy sybarites and better houses where slums are to-day, or it might have meant greater privations for the Roman slaves and more cocktails for the modern rich.

The process of adding to the heritage of improvement does not consist only in " saving " in the sense of " spending " less than income.[1] Individuals who save part of their incomes do direct labour into channels where it will add to the heritage of improvement, but this can be effected in other ways as well. Money spent on research which brings in no return to the spender in money or money's worth is not regarded by him or anyone else as saving, however fruitful the result may be to the community at large, and a great deal of fruitful research is carried out in consequence of the natural thirst for knowledge, and the desire for fame and the benefit of mankind. The political States are sometimes regarded as saving when their receipts exceed their current expenditure and they invest the surplus in profitable enterprises or in redemption of debt, but nobody talks of their saving when they expend the proceeds of taxes on the construction of additional and useful roads, though this increases the heritage of improvement just as much as if the taxes were not levied, and the individuals from whom they would have been drawn saved an equivalent amount and invested it in making the same roads.

Much of the heritage of improvement is not the exclusive property of any person or institution. Only a small part of the results of invention can be either kept secret or patented, and patents only last for a short time. No one is in possession of an exclusive privilege to make or use matches, the printing press, or the internal combustion engine. The knowledge acquired by the past and transmitted to us is nearly all free goods. So are the various forms of organisation. Subject to some difficulties caused by the existence of territorial states and the absence of any areas not claimed by these states, any body of persons can take advantage of any known plans of organisation. The existing joint-stock companies and co-operative societies do not possess rights preventing the formation of others on their model. It is only a trifling part of organisation which can be appropriated to particular persons by goodwills and trade-marks.

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[1] I have protested elsewhere against the current misuse by certain writers of the word " saving," to indicate spending less *than before* instead of spending less than income. *Economic Journal*, March 1932, pp. 123-8.

Even the third of our three divisions of the heritage is far from being exclusively composed of the private property of individuals. In addition to the movable and immovable material products of past labour which are the property of individuals it includes much which is in the hands of the national states and their subdivisions, and is managed by these institutions for the benefit of all-comers either gratuitously or subject to payments which differ from those which would be exacted by private owners. Important examples of this class of things are the improvements of land known as roads and bridges provided for the benefit of all who wish to walk or drive vehicles over land; the improvements of the sea known as lighthouses and lightships for the benefit of all who sail on the sea; public waterworks and sewers provided for all whose habitations lie alongside them.

It is a curious thing that the school of economists who believed strongly in the beneficence of " natural liberty " and the spontaneous efforts of every man to better his own economic position, should have disbelieved entirely in the possibility of language being developed and improved by the long-continued efforts of ordinary persons to make themselves intelligible to each other. Instead of accepting what, on the analogy of " natural liberty " they might have called " natural language," they habitually " interfered " with the natural effort of every man to make himself intelligible, and endeavoured to displace the " natural " meanings of economic terms by purely " artificial " ones. Adam Smith set a very bad example when he, quite untruly, accused " common language " of " confounding " different things. We British and American economists would do well to eschew that example, and recognise that the English language, understood by over two hundred million persons, is a much more useful instrument than any of the babel of jargons which individual economists have invented apparently each for his own individual use.

" Capital " is one of the terms which have suffered most in this way, so that it is quite possible that among the scores of ill-considered " definitions " which have been put forward, there may be one or two which would make the capital of human society as a whole coincident with what I have called the heritage of improvement. But few economic writers who put forward definitions make much attempt to follow them, and I think we may safely say that no one ever deliberately uses the term in that sense. Ordinary usage connects the term inseparably with money; we do not say " Farmer Giles' capital is a hundred cows, one tractor," and so on, nor that the capital of the Great Western Railway is certain stations, certain thousands of rolling stock, and so on, but that it is a certain number of pounds.

The economists, following their usual and on the whole praiseworthy practice of trying to " get behind " money to the " real things " of which it is the value (as in Farmer Giles' case), or at any rate the conventional representative (as in that of the G.W.R.), made suggestive inventories of the goods covered by the sums of money at which capitals were stated, and represented these things as the " real capital " of their owners. They then massed together all of these things which were in the ownership of individuals and companies of individuals and declared this to be the capital of society. In the age preceding the great development of State action and quasi-public institutions like port authorities, it did not occur to Adam Smith to ask himself whether anything more was to be added to the capital of individuals in order to make a complete account of the capital of society. As he thought of an individual's capital as that part of his whole stock (i.e. his whole property other than land) from which he expects a money-income, he would probably, if the point had been put to him, have admitted such part of the stock of the State as seemed to him to be bringing in a profit rather than to be a mere engine of taxation, and so would have included the post office and municipal gasworks, but have excluded toll-free roads and rate-supported waterworks. More than a century later Marshall went little further than this. After dallying with an immense extension of the conception by saying " there are many things, such as roads, bridges and the organisation of the State, which are part of capital and are important when capital is regarded from the point of view of the nation " (*Principles*, 1st edn., p. 132), he decided eventually to " count as capital from the social point of view all things other than land which yield income that is generally reckoned as such in common discourse; together with similar things in public ownership, such as government factories " (*Principles*, 8th edn., p. 78). This certainly excludes " the organisation of the State " and possibly roads, though the Note to the chapter on the " Growth of Wealth " quotes, without objection, Chiozza Money's estimate of " public roads, parks, buildings, bridges, sewers, lighting and waterworks, tramways, etc.," in the United Kingdom at £1,650 millions (*ibid.*, p. 239).

Whatever they may have said in their formal discussions of the nature of capital, the usual practice of the economists has been to refrain from extending the conception of " real capital " so as to make it include anything except things which are easily valued in money because they are commonly and openly sold for money and bought with money by respectable people. This has excluded a very large part of the heritage of improvement; the whole of what is common property open to the use of all men is shut out completely, and most of the property of states and their local subdivisions can only be included with great difficulty and doubt, because it can only be valued in money by the aid of assumptions which create a world so unlike the real world that the values arrived at really mean nothing to us. How can we set down a capital value for existing roads ? They are not commonly bought and sold, and we cannot imagine them being sold by the present road authorities without imagining also the whole scheme which would be required for securing that the purchasers should get a return on the purchase money. Obviously, how much the purchasers would give would depend on their power to collect tolls or other charges, and what power would be given by law and how far the power given by law could be exercised with profit can only be the subject of the wildest guessing. If it is suggested that selling value being unascertainable, we must fall back on cost of construction, the answer is that this goes back to the time at least of the Roman Empire, and besides is hopelessly mixed up with cost of maintenance. If cost of construction is dismissed and cost of reconstruction substituted, we find ourselves again in an altogether too imaginary world, since if any actual reconstruction were to take place it would not be a reconstruction of the existing works, but of something quite different. Moreover, any valuation on the basis of constructional cost would be quite out of line with the valuation of private property. And, finally, we may add that the fanciful statisticians who have set down a few hundred millions for the value of public properties in their estimates of their country's "national capital" seem to have forgotten that if these properties were in private ownership, the value attributed to existing private properties would be different from what it is now.

In view of these facts it is not surprising that, in spite of definitions, the economists have virtually acquiesced in the practice of the more numerous persons who speak "common language," and have confined the conception of the capital of society to things ordinarily thought of as private property purchasable and saleable without much obstruction from law or public opinion. The decision, however unconscious it has been, is a sound one. The term capital is a useful one in its ordinary application to the property of individuals, and there was not the least reason for trying to extend it to make it cover the whole economic heritage.

But immense mischief has resulted from the fact that by their failure to insist on the difference between the aggregate of capital and the whole economic heritage combined with their somewhat excessive glorification of capital, the eighteenth-century and nineteenth-century economists gave rise to a widespread impression that the capital of society is much the same thing as the whole heritage, so that alterations in its magnitude must be regarded with the same favour and disfavour as increases and decreases of the whole heritage.

The trend of industrial development in the eighteenth and nineteenth centuries inclined the economists of that age to connect improvement too closely with the provision of bulky and elaborate machinery. Invention seemed to them to be always suggesting the desirability of new machines which were larger amounts of "real capital" than those used before. If the introduction of these machines led to the disuse of the older kind, as the introduction of railways worked over by steam locomotives led to the disuse of the English small barge canals, it did not occur to them that invention was destroying capital in the shape of the canals at the same time as it was showing the advantage of creating capital in the new form of the railways, and as for inventions which, instead of requiring additions to material equipment, economise that equipment, like the discovery of methods of utilising a telegraph wire for more than one message at the same time, they never thought of these at all. The consequent undue glorification of capital reached its zenith in the doctrine attributed to Böhm-Bawerk (who, however, denied[1] that he had ever taught it) that there is something inherently superior in " roundabout methods " and a long period elapsing between the start and finish of production. There are, of course, an *infinite* number of roundabout and lengthy ways of doing things which are *less* productive than the direct ways, but none of these are adopted except by mistake, so that the roundabout methods *which are commonly adopted* are the few which happen to be more productive. *Those which we see* are more productive than the direct methods, but this should not lead us to forget the existence of an infinite number which are less productive.[2] It is sometimes quicker to go under Parliament Street by the subway than to cross directly on the surface, but it is quicker to wait for an interval in the traffic and cross on the surface than to take a taxi to St. Pancras and travel by L.M.S. and S.R. via Derby and Bournemouth to Waterloo Station. We *might* use a button-hook for buttoning our waistcoats, but we don't, and it isn't want of capital that prevents us, but knowledge that the direct method of using finger and thumb is more productive.

We are safe in regarding additions to the material equipment of society with complacency as a rule because, barring mistakes, neither individuals nor institutions add things which are not useful, and mistakes, though frequent, are the exception rather than the rule. But it is by no means safe to deplore "loss" or diminution of capital as if it were necessarily destruction of useful equipment. It may be so, of course, as when useful buildings are destroyed by fire, flood or earthquake, and cattle are killed by a pestilence. But " losses " or disappearances of capital do not occur only in the form of physical destruction of material equipment. We may lose our capital even when the things which it consists of remain in our possession in just as good condition as ever. This happens because we measure it by value. If our house drops in value from £2,000 to £1,000 we have lost half the capital we had in it, though the house may be in as good or better condition and as useful as ever for our purposes; if we have some machinery which was worth £1,000 and is now only just worth the cost of carrying it away, we have lost all the £1,000 of capital.

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[1] In the Excursus accompanying the 4th edition of *Kapital und Kapitalzins*, pp. 75-77. In the first edition of the *Positive Theory* he says in Bk. II, ch. ii, that in Bk. I, ch. ii, he has explained that to be more productive the roundabout methods must be wisely chosen, but in fact the qualification does not appear in that chapter.

[2] " Are there not innumerable processes which take a long time and are roundabout, but are not productive and, therefore, are not used ? "—Marshall, *Principles*, 3rd edn., 1895, p. 664, note ; 8th edn., p. 583, note.

No other measure than value is possible. Nor is there any reason for being dissatisfied with value as the measure. To the individual owner, value is the important thing. A rise in his capital as measured by value pleases him, because if the rate of interest does not change, the rise will mean a rise of income to him, and even if the rise merely reflects a general fall in the rate of interest, so that his income remains unchanged, he is pleased, because in certain contingencies he or his heirs may find it expedient to " treat capital as income," that is, to sell whatever constitutes his capital, or part of it, and spend the proceeds in satisfying current needs. The same considerations apply, though not with the same strength, to a large body of individuals, such as that which we rather loosely conceive as a " nation." A nation does not retire from business, or die and leave children to be supported by expenditure of capital, but it has been known to sell its investments abroad in order to pay the current expense of a war.

But when we think not of individuals taken separately, nor even of groups like nations taken separately, but of human society as a whole—or if the reader prefers, when we think of a nation isolated from intercourse with others—changes in the magnitude of capital, measured in the only possible way, by value, assume a somewhat different aspect. Additions to society's stock of material equipment may still be regarded with complacency, because they are not made, except by mistake, unless they are, so far as people can foresee, likely to be useful. Physical destruction of material equipment arising from calamities, such as fire, earthquake and riot, can still be quite reasonably deplored, and so also can ordinary wearing-out and decay. But a most frequent cause of loss or diminution of capital is some increase or improvement in the part of the heritage which is not capital, and such losses are not to be deplored even when they cause or are coincident with a diminution of the aggregate capital of society. To deplore the " loss of capital " involved in the fall in the value of the small barge canals caused by the invention of steam locomotion on rails and the consequent introduction of railways would be absurd, and it would be still more absurd if the canals had been superseded not by big works like the railways, but by some less elaborate contrivance such as the " wishing carpets " of fiction, or better still by some change in organisation which obviated the necessity of heavy transport. To have machinery of production is a good thing when we cannot attain our ends without it; but if we can attain our ends more easily or quickly without it, so much the better. If we could improve our knowledge and organisation in such a way as to wipe out the value of all the things which now form our real capital, how happy we should be!

A very short time ago these remarks would have seemed to me to be trite and unnecessary; but the curious cult of the doctrine that consumption of capital prevails, or is about to prevail, and that we ought to be much distressed about it, now appears to make it desirable to insist on the difference between capital and the economic heritage. To argue that the alleged actual or probable decay of capital is a mere bogy is little use in dealing with theorists whose determined pessimism prevents their being able to see the concrete additions to capital all around them. But it may be of some use to insist on the fact that there are other ways of adding to the heritage of improvement beside saving and addition to capital, and that the other additions to the heritage often call for no addition to capital; but on the contrary, wipe capital out, and are all the more beneficent for thus enabling us to discard the tools, machinery, or stock rendered unnecessary.

To make our flesh really creep, the capital consumptionists must prove not merely that human society is losing capital, but that it is damaged by the loss. It is not an evil to learn how to get what we want more easily than before by more direct and rapid methods.

Carl Menger[1]

By F. A. von Hayek

The history of economics is full of tales of forgotten forerunners, men whose work had no effect and was only rediscovered after their main ideas had been made popular by others, of remarkable coincidences of simultaneous discoveries, and of the peculiar fate of individual books. But there must be few instances, in economics or any other branch of knowledge, where the works of an author who revolutionised the body of an already well-developed science and who has been generally recognised to have done so, have remained so little known as those of Carl Menger. It is difficult to think of a parallel case where a work such as the *Grundsätze* has exercised a lasting and persistent influence but has yet, as a result of purely accidental circumstances, had so extremely restricted a circulation.

There can be no doubt among competent historians that if, during the last sixty years, the Austrian School has occupied an almost unique position in the development of economic science, this is entirely due to the foundations laid by this one man. The reputation of the School in the outside world and the development of its system at important points were due to the efforts of his brilliant followers, Eugen von Böhm-Bawerk and Friedrich von Wieser. But it is not unduly to detract from the merits of these writers to say that its fundamental ideas belong fully and wholly to Carl Menger. If he had not found these principles he might have remained comparatively unknown, might even have shared the fate of the many brilliant men who anticipated him and were forgotten, and almost certainly would for a long time have remained little known outside the countries of the German tongue. But what is common to the members of the Austrian School, what constitutes their peculiarity and provided the foundations for their later contributions is their acceptance of the teaching of Carl Menger.

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[1] This biographical study was written as an Introduction to the Reprint of Menger's *Grundsätze der Volkswirtschaftslehre* which constitutes the first of a series of four Reprints embodying Menger's chief published contributions to Economic Science and which are published by the London School of Economics as Numbers 17 to 20 of its *Series of Reprints of Scarce Works in Economics and Political Science*. (Nos. 17 and 18, containing reprints of the *Grundsätze der Volkswirtschaftslehre* and the *Untersuchungen über die Methode der Sozialwissenschaften* have already appeared; the remaining volumes will follow shortly.) In view of the absence of any extensive biographical study of Carl Menger in English, or any other language, it has been thought desirable to present it also in this form.—[*Editors*.]

The independent and practically simultaneous discovery of the principle of marginal utility by William Stanley Jevons, Carl Menger, and Leon Walras is too well known to require retelling. The year 1871, in which both Jevons' *Theory of Political Economy* and Menger's *Grundsätze* appeared, is now generally and with justice regarded as the beginning of the modern period in the development of economics. Jevons had outlined his fundamental ideas nine years earlier in a lecture (published in 1866) which, however, attracted little attention, and Walras began to publish his contribution only in 1874, but the complete independence of the work of the three founders is quite certain. And indeed, although their central positions, the point in their system to which they and their contemporaries naturally attached the greatest importance, are the same, their work is so clearly distinct in general character and background that the most interesting problem is really how so different routes should have led to such similar results.

To understand the intellectual background of the work of Carl Menger, a few words on the general position of economics at that time are required. Although the quarter of a century between about 1848, the date of J. S. Mill's *Principles*, and the emergence of the new school saw in many ways the greatest triumphs of the classical political economy in the applied fields, its foundations, particularly its theory of value, had become more and more discredited. Perhaps the systematic exposition in J. S. Mill's *Principles* itself, in spite or because of his complacent satisfaction about the perfected state of the theory of value, together with his later retractions on other essential points of the doctrine, did as much as anything else to show the deficiencies of the classical system. In any case, critical attacks and attempts at reconstruction multiplied in most countries.

Nowhere, however, had the decline of the classical school of economists been more rapid and complete than in Germany. Under the onslaughts of the Historical School not only were the classical doctrines completely abandoned—they had never taken very firm root in that part of the world—but any attempt at theoretical analysis came to be regarded with deep distrust.

This was partly due to methodological considerations. But even more it was due to an intense dislike of the practical conclusions of the classical English School—which stood in the way of the reforming zeal of the new group which prided itself on the name of the "ethical school." In England the progress of economic theory only stagnated. In Germany a second generation of historical economists grew up who had not only never become really acquainted with the one well-developed system of theory that existed, but had also learnt to regard theoretical speculations of any sort as useless if not positively harmful.

The doctrines of the classical school were probably too much discredited to provide a possible basis of reconstruction for those who were still interested in problems of theory. But there were elements in the writings of the German economists of the first half of the century which contained the germs for a possible new development.[1] One of the reasons why the classical doctrines had never firmly established themselves in Germany was that German economists had always remained conscious of certain contradictions inherent in any cost or labour theory of value. Owing, perhaps, partly to the influence of Condillac and other French and Italian authors of the eighteenth century a tradition had been kept alive which refused to separate value entirely from utility. From the early years of the century into the 'fifties and 'sixties a succession of writers, of whom Hermann was probably the outstanding and most influential figure (the wholly successful Gossen remaining unnoticed), tried to combine the ideas of utility and scarcity into an explanation of value, often coming very near to the solution provided by Menger. It is to these speculations, which to the more practical minds of the contemporary English economists must have appeared useless excursions into philosophy, that Menger owed most. A glance through the extensive footnotes in his *Grundsätze*, or the author's index which has been added to the present edition, will show how extraordinarily wide a knowledge he possessed of these German authors and also of the French and Italian writers, and how small a rôle the writers of the classical English school play in comparison.

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[1] The same is largely true of France. Even in England there was a kind of unorthodox tradition, of which the same may be said, but it was completely obscured by the dominant classical school. It is, however, important here because the work of its outstanding representative, Longfield, had through the intermediaryship of Hearn no doubt some influence on Jevons.

But while Menger probably surpassed all his fellow-founders of the marginal utility doctrine in the width of his knowledge of the literature—and only from a passionate book collector inspired by the example of the encyclopædic Roscher could one expect a similar knowledge at the early age the *Grundsätze* was written—there are curious gaps in the list of authors to whom he refers which go far to explain the difference of his approach from that of Jevons and Walras.[1] Particularly significant is his apparent ignorance, at the time when he wrote the *Grundsätze*, of the work of Cournot, to whom all the other founders of modern economics, Walras, Marshall, and very possibly Jevons[2], seem to have been directly or indirectly indebted. Even more surprising, however, is the fact that at that time Menger does not seem to have known the work of von Thünen, which one would have expected him to find particularly congenial. While it can be said, therefore, that he worked in an atmosphere distinctly favourable to an analysis on utility lines, he had nothing so definite on which to build a modern theory of price as his fellows in the same field, all of whom came under the influence of Cournot, to which must be added, in the case of Walras, that of Dupuit[3] and, in the case of Marshall, that of von Thünen.

It is an interesting speculation to think what direction the development of Menger's thought would have taken if he had been acquainted with these founders of mathematical analysis. It is a curious fact that, so far as I am aware, he has nowhere commented on the value of mathematics as a tool of economic analysis. There is no reason to assume that he lacked either the technical equipment or the inclination. On the contrary, his interest in the natural sciences is beyond doubt, and a strong bias in favour of their methods is evident throughout his work. And the fact that his brothers, particularly Anton, are known to have been intensely interested in mathematics, and that his son Karl became a noted mathematician, may probably be taken as evidence of a definite mathematical strain in the family. But although he knew later not only the work of Jevons and Walras, but also that of his compatriots Auspitz and Lieben, he does not even refer to the mathematical method in any of his writings on methodology.[1] Must we conclude that he felt rather sceptical about its usefulness ?

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[1] It is hardly surprising that he did not know his immediate German predecessor H. H. Gossen, but neither did Jevons or Walras when they first published their ideas. The first book which did justice at all to Gossen's work, F. A. Lange's *Arbeiterfrage* (2nd ed.), appeared in 1870 when Menger's *Grundsätze* was probably already being set up in print.

[2] Dr. Hicks tells me that he has some reason to believe that Lardner's diagrammatic exposition of the theory of monopoly, by which Jevons according to his own testimony was mainly influenced, derives from Cournot. On this point see Dr. Hicks's article on Leon Walras which is to appear in one of the next issues of *Econometrica.*

[3] Menger did, however, know the work of Leon Walras's father, A. A. Walras, whom he quotes on p. 54 of the *Grundsätze*.

Among the influences to which Menger must have been subject during the formative period of his thought there is a complete absence of influence of Austrian economists, for the simple reason that, in the earlier part of the nineteenth century in Austria, there were practically no native economists. At the universities where Menger studied, political economy was taught as part of the law curriculum, mostly by economists imported from Germany. And though Menger, like all the later Austrian economists, proceeded to the degree of Doctor of Law, there is no reason to believe that he was really stimulated by his teachers in economics. This, however, leads us to his personal history.

Born on February 28th, 1840, in Neu-Sandec, Galicia, the territory of the present Poland, the son of a lawyer, he came from an old family of Austrian craftsmen, musicians, civil servants and army officers, who had, only a generation before, moved from the German parts of Bohemia to the Eastern provinces. His mother's father,[2] a Bohemian merchant who had made a fortune during the Napoleonic wars, bought a large estate in Western Galicia where Carl Menger spent a great part of his boyhood, and before 1848 still saw the conditions of semi-servitude of the peasants which, in this part of Austria had persisted longer than in any part of Europe outside Russia. With his two brothers, Anton, later the well-known writer on law and socialism, author of the *Right to the Whole Produce of Labour*, and Carl's colleague at the faculty of law of the University of Vienna, and Max, in his days a well-known

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[1] The only exception to this statement, a review of R. Auspitz and R. Lieben, *Untersuchungen über die Theorie des Preises*, in a daily newspaper (the *Wiener Zeitung* of July 8th, 1889), can hardly be called an exception, as he expressly says that he does not want to comment there on the value of mathematical exposition of economic doctrines. The general tone of the review as well as his objection to the fact that the authors " in his opinion use the mathematical method not only as a means of exposition but as a means of research " confirms the general impression that he did not consider it as particularly useful.

[2] Anton Menger, the father of Carl, was the son of another Anton Menger, who came from an old German family that had in 1623 emigrated to Eger in Bohemia, and of Anna *née* Müller. His wife, Caroline, was the daughter of Josef Gerzabek, merchant in Hohenmaut, and of Therese, *née* Kalaus, whose ancestors can be traced in the register of baptism of Hohenmaut back into the 17th and 18th centuries respectively.

Austrian parliamentarian and writer on social problems, he went to the Universities of Vienna (1859-60) and Prague (1860-3). After taking his doctor's degree at the University of Cracow he devoted himself first to journalism, writing for papers in Lemberg and later in Vienna, on economic questions. After a few years he entered the Civil Service in the press department of the Austrian " Ministerratspräsidium," an office which had always retained a very special position in the Austrian Civil Service and attracted many men of great talent.

Wieser reports that Menger once told him that it was one of his duties to write surveys of the state of the markets for an official newspaper, the *Wiener Zeitung*, and that it was in studying the market reports that he was struck by the glaring contrast between the traditional theories of price and the facts which experienced practical men considered as decisive for the determination of prices. Whether this was really the original cause which led Menger to the study of the determination of prices or whether, which seems more likely, it only gave a definite direction to studies which he had been pursuing since he had left the university, we do not know. There can be little doubt, however, that during the years intervening between the date when he left the university and the publication of the *Grundsätze* he must have worked intensely on these problems, delaying publication until his system was fully worked out in his mind.[1]

He is said to have once remarked that he wrote the *Grundsätze* in a state of morbid excitement. This can hardly mean that this book was the product of a sudden inspiration, planned and written in great haste. Few books can have been more carefully planned; rarely has the first exposition of an idea been more painstakingly developed and followed up in all its ramifications. The slender volume which appeared early in 1871 was intended as a first, introductory part of a comprehensive treatise. It dealt with the fundamental questions, on which he disagreed with accepted opinion, with the exhaustiveness necessary to satisfy the author that he was building on absolutely firm ground. The problems treated in this " First, General Part," as it is described on the title page, were the general conditions which led to economic activity, value exchange, price, and money. From manuscript notes communicated by his son more than fifty years later, in the introduction to the second edition, we know that the second part was to treat " interest, wages, rent, income, credit, and paper money," a third " applied " part the theory of production and commerce, while a fourth part was to discuss criticism of the present economic system and proposals for economic reform.

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[1] The earliest manuscript notes on the theory of value which have been preserved date from the year 1867.

His main aim, as he says in the preface (p. x, cf. also p. 143n), was a uniform theory of price which would explain all price phenomena and in particular also interest, wages, and rent by one leading idea. But more than half of the volume is devoted to matters which only prepare the way for that main task—to the concept which gave the new school its special character, *i.e.* value in its subjective, personal sense. And even this is not reached before a thorough examination of the main concepts with which economic analysis has to work.

The influence of the earlier German writers with their predilection for somewhat pedantic classifications and long-winded definitions of concepts is here clearly noticeable. But in Menger's hands the time-honoured "fundamental concepts" of the traditional German textbook assume new life. Instead of a dry enumeration and definition they become the powerful instrument of an analysis in which every step seems to result with inevitable necessity from the preceding one. And though Menger's exposition still lacks many of the more impressive phrases and elegant formulations of the writings of Böhm-Bawerk and Wieser, it is in substance hardly inferior and in many respects definitely superior to these later works.

It is not the purpose of the present introduction to give a connected outline of Menger's argument. But there are certain less known, somewhat surprising, aspects of his treatment which deserve special mention. The careful initial investigation of the causal relationship between human needs and the means for their satisfaction, which within the first few pages leads him to the now celebrated distinction between goods of the first, second, third and higher orders, and the now equally familiar concept of complementarity between different goods, is typical of the particular attention which, the widespread impression to the contrary notwithstanding, the Austrian School has always given to the technical structure of production —an attention which finds its clearest systematic expression in the elaborate " vor-werttheoretischer Teil " which precedes the discussion of the theory of value in Wieser's late work, the *Theory of Social Economy*, 1914.

Even more remarkable is the prominent rôle which the element of time plays from the very beginning. There is a very general impression that the earlier representatives of modern economics were inclined to neglect this factor. In so far as the originators of the mathematical exposition of modern equilibrium theory are concerned, this impression is probably justified. Not so with Menger. To him economic activity is essentially planning for the future, and his discussion of the period, or rather different periods, to which human forethought extends as regards different wants (see particularly pp. 34-6) has a definitely modern ring.

It is somewhat difficult to believe now that Menger was the first to base the distinction between free and economic goods on the idea of scarcity. But, as he himself says (p. 70n), while the very concept was not known in the English literature, the German authors who had used it before him, and particularly Hermann, had all been trying to base the distinction on the presence or absence of cost in the sense of effort. But, very characteristically, while all of Menger's analysis is grounded on the idea of scarcity, this simple term is nowhere used. " Insufficient quantity " or " das ökonomische Mengenverhältnis " are the very exact but somewhat cumbersome expressions which he uses instead.

It is characteristic of his work as a whole that he attaches more importance to a careful description of a phenomenon than to giving it a short and fitting name. This frequently prevents his exposition from being as effective as might have been wished. But it also protects him against a certain one-sidedness and a tendency towards over-simplification to which a brief formula so easily leads. The classic instance of this is, of course, the fact that Menger did not originate—nor, so far as I know, ever use—the term marginal utility introduced by Wieser, but always explained value by the somewhat clumsy but precise phrase, " the importance which concrete goods, or quantities of goods, receive for us from the fact that we are conscious of being dependent on our disposal over them for the satisfaction of our wants," and describes the magnitude of this value as equal to the importance which attached to the least important satisfaction which is secured by a single unit of the available quantity of the commodity (pp. 87 and 99).

Another, perhaps less important but not insignificant instance of Menger's refusal to condense explanations in a single formula, occurs even earlier in the discussion of the decreasing intensity of individual wants with increasing satisfaction. This physiological fact, which later under the name of "Gossen's law of the satisfaction of wants" was to assume a somewhat disproportionate position in the exposition of the theory of value, and was even hailed by Wieser as Menger's main discovery, takes in Menger's system the more appropriate minor position as one of the factors which enable us to arrange the different individual sensations of want in order of their importance.

On yet another and a more interesting point in connection with the pure theory of subjective value Menger's views are remarkably modern. Although he speaks occasionally of value as measurable, his exposition makes it quite clear that by this he means no more than that the value of any one commodity can be expressed by naming another commodity of equal value. Of the figures which he uses to represent the scales of utility he says expressly that they are not intended to represent the absolute, but only the relative importance of the wants (pp. 163-76), and the very examples he gives when he first introduces them makes it perfectly clear that he thinks of them not as cardinal but as ordinal figures (p. 92).[1]

Next to the general principle which enabled him to base the explanation of value on utility the most important of Menger's contributions is probably the application of this principle to the case where more than one good is required to secure the satisfaction of any want. It is here that the painstaking analysis of the causal relationship between goods and wants in the opening chapters and the concepts of complementarity and of goods of different orders bears its fruits. Even to-day it is hardly recognised that Menger answered the problem of the distribution of the utility of a final product between the several co-operating commodities of a higher order—the problem of imputation as it was later called by Wieser—by a fairly developed theory of marginal productivity. He distinguishes clearly between the case where the proportions in which two or more factors can be used in the production of any commodity are variable and the case where they are fixed. He answers the problem of imputation in the first case by saying that such quantities of the different factors as can be substituted for each other in order to get the same additional quantity of the product must have equal value, while in the case of fixed proportions he points out that the value of the different factors is determined by their utility in alternative uses (pp. 138-42).

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[1] Further aspects of Menger's treatment of the general theory of value which might be mentioned are his persistent emphasis on the necessity to classify the different commodities on economic rather than technical grounds (cf. pp. 115-17 and 130n), his distinct anticipation of the Böhm-Bawerkian doctrine of the underestimation of future wants (pp. 122 and 127-8), and his careful analysis of the process by which the accumulation of capital turns gradually more and more of the originally free factors into scarce goods.

In this first part of his book, which is devoted to the theory of subjective value, and compares well with the later exposition by Wieser, Böhm-Bawerk and others, there is really only one major point on which Menger's exposition leaves a serious gap. A theory of value can hardly be called complete and will certainly never be quite convincing if the rôle that cost of production plays in determining the relative value of different commodities is not explicitly explained. At an early point of his exposition Menger indicates that he sees the problem and promises a later answer. But this promise is never fulfilled. It was left to Wieser to develop what later became known as the principle of opportunity cost or " Wieser's Law," *i.e.* the principle that the other uses computing for the factors will limit the quantity available for any one line of production in such a way that the value of the product will not fall below the sum of the value which all the factors used in its production obtain in these competing uses.

It has sometimes been suggested that Menger and his school were so pleased with their discovery of the principles governing value in the economy of an individual that they were inclined to apply the same principles in an all too rapid and over-simplified way to the explanation of price. There may be some justification for such a suggestion so far as the works of some of Menger's followers, particularly the younger Wieser, are concerned. But it certainly cannot be said of Menger's own work. His exposition completely conforms to the rule later so much emphasised by Böhm-Bawerk, that any satisfactory explanation of price would have to consist of two distinct and separate stages of which the explanation of subjective value is only the first. It only provides the basis for an explanation of the causes and limits of exchanges between two or more persons. Menger's arrangement in the *Grundsätze* is exemplary in this respect. The chapter on exchange which precedes that on price makes the influence of value in the subjective sense on the objective exchange relationships quite clear without postulating any greater degree of correspondence than is actually justified by the assumptions.

The chapter on price itself, with its careful investigation of how the relative valuations of the individual participants in the exchange themselves will affect the ratios of exchange in the case of an isolated exchange of two individuals, under conditions of monopoly and finally under conditions of competition, is the third and probably the least known of the main contributions of the *Grundsätze*. Yet it is only in reading this chapter that one realises the essential unity of his thought, the clear aim which directs his exposition from the beginning to this crowning achievement.

On the final chapters, which deal with the effects of production for a market, the technical meaning of the term " commodity " (*Ware*) as distinguished from the simple " good," their different degrees of saleability leading up to the introduction and discussion of money, little need be said at this point. The ideas contained here and the fragmentary remarks on capital contained in earlier sections are the only sections of this first work which were developed further in his printed work later on. Although they embody contributions of lasting influence, it was mainly in their later, more elaborate exposition that they became known.

The considerable space devoted here to the discussion of the contents of the *Grundsätze* is justified by the outstanding character of this work among Menger's publications and, indeed, among all the books which have laid the foundations of modern economics. It is, perhaps, appropriate to quote in this connection the judgment of the scholar best qualified to assess the relative merits of the different variants of the modern school, of Knut Wicksell who was the first, and hitherto the most successful, to combine what is best in the teaching of the different groups. " His fame," he says, " rests on this work and through it his name will go down to posterity, for one can safely say that since Ricardo's *Principles* there has been no book—not even excepting Jevons' brilliant if rather aphoristic achievement and Walras's unfortunately difficult work—which has exercised such great influence on the development of economics as Menger's *Grundsätze*."[1]

But the immediate reception of the book can hardly be called encouraging. None of the reviewers in the German journals seem to have realised the nature of its main contribution.[2] At home Menger's attempt to obtain, on the strength of this work, a lectureship (*Privatdozentur*) at the University of Vienna succeeded only after some difficulty. He can scarcely have known that, just before he began his lectures, there had just left the University two young men who immediately recognised that his work provided the " Archimedian point," as Wieser called it, by which the existing systems of economic theory could be lifted out of their hinges. Böhm-Bawerk and Wieser, his first and most enthusiastic disciples, were never his direct pupils, and their attempt to popularise Menger's doctrines in the seminars of the leaders of the older historical school, Knies, Roscher, and Hildebrand, was fruitless.[1] But Menger gradually succeeded in gaining considerable influence at home. Soon after his promotion to the rank of *professor extraordinarius* in 1873 he resigned from his position in the prime minister's office, to the great surprise of his chief, Prince Auersperg, who found it difficult to understand that anybody should want to exchange a position with prospects to satisfy the greatest ambition for an academic career.[2] But this did not yet mean Menger's final *adieu* to the world of affairs. In 1876 he was appointed one of the tutors to the ill-fated Crown Prince Rudolph, then eighteen years of age, and accompanied him during the next two years on his extensive travels through the greater part of Europe, including England, Scotland, Ireland, France and Germany. After his return he was appointed in 1879 to the chair of political economy in Vienna, and thenceforward he settled down to the secluded and quiet life of the scholar which was to be so characteristic of the second half of his long life.

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[1] *Ekonomisk Tidskrift*, 1921, p. 118.

[2] An exception should, perhaps, be made for Hack's review in the *Zeitschrift für die gesamte Staatswissenschaft*, 1872, who not only emphasised the excellence of the book

By this time the doctrines of his first book—apart from a few short reviews of books he had published nothing in the intervening period—were beginning to attract wider attention. Rightly or wrongly, with Jevons and Walras it was the mathematical form rather than the substance of their teaching which appeared to be their main innovation, and which contributed

and the novelty of its method of approach, but also pointed out as opposed to Menger that the economically relevant relationship between commodities and wants was not that of cause and effect but one of means and end.

[1] It might not be altogether out of place to correct a wrong impression which may be created by A. Marshall's assertion that between the years 1870 and 1874, when he developed the details of his theoretical position, " Böhm-Bawerk and Wieser were still lads at school or college. . . ." (*Memorials of Alfred Marshall*, p. 417). Both had left the University together and entered civil service in 1872, and in 1876 were already in a position to expound in reports to Knies's seminar in Heidelberg the main elements of their later contribution.

[2] Menger had at that time already declined the offer of professorships in Karlsruhe (1872), Basel (1873), and a little later also declined an offer of a professorship in the Zürich Polytechnic with prospects to a simultaneous professorship at the University.

the chief obstacle to their acceptance. But there were no obstacles of this sort to an understanding of Menger's exposition of the new theory of value. During the second decade after the publication of the book, its influence began to extend with great rapidity. At the same time Menger began to acquire considerable reputation as a teacher, and to attract to his lectures and seminars an increasing number of students, many of whom soon became economists of considerable reputation. In addition to those already noted, among the early members of his school his contemporaries Emil Sax and Johann von Komorzynski, and his students Robert Meyer, Robert Zuckerkandl, Gustav Gross, and—at a somewhat later date—H. von Schullern-Schrattenhofen, Richard Reisch and Richard Schüller deserve special mention.

But, while at home a definite school was forming, in Germany, even more than in other foreign countries, economists maintained a hostile attitude. It was at this time that the younger Historical School, under the leadership of Schmoller, was gaining the greatest influence in that country. The "*Volkswirtschaftliche Kongress*," which had preserved the classical tradition, was superseded by the newly founded "*Verein für Sozialpolitik*." Indeed the teaching of economic theory was more and more excluded from German universities. Thus Menger's work was neglected, not because the German economists thought that he was wrong, but because they considered the kind of analysis he attempted was useless.

Under these conditions it was only natural that Menger should consider it more important to defend the method he had adopted against the claims of the Historical School to possess the only appropriate instrument of research, than to continue the work on the *Grundsätze*. It is to this situation that his second great work, the *Untersuchungen über die Methode der Socialwissenschaften und der politischen Oekonomie insbesondere* is due. It is well to remember that in 1875 when Menger started to work on that book, and even in 1883 when it was published, the rich crop of works by his disciples which definitely established the position of the school, had not yet begun to mature, and that he might well have thought that it would be wasted effort to continue while the question of principle was not decided.

In their way the *Untersuchungen* are hardly less an achievement than the *Grundsätze*. As a polemic against the claims of the Historical School to an exclusive right to treat economic problems the book can hardly be surpassed. Whether the merits of its positive exposition of the nature of theoretical analysis can be rated as high is, perhaps, not quite certain. If this were, indeed, its main title to fame there might be something in the suggestion occasionally heard among Menger's admirers that it was unfortunate that he was drawn away from his work on the concrete problems of economics. This is not to mean that what he said on the character of the theoretical or abstract method is not of very great importance or that it had not very great influence. Probably it did more than any other single book to make clear the peculiar character of the scientific method in the social sciences, and it had a very considerable effect on professional "methodologists" among German philosophers. But to me, at any rate, its main interest to the economist in our days seems to lie in the extraordinary insight into the nature of social phenomena which is revealed incidentally in the discussion of problems mentioned to exemplify different methods of approach, and in the light shed by his discussion of the development of the concepts with which the social sciences have to work. Discussions of somewhat obsolete views, as that of the organic or perhaps better physiological interpretation of social phenomena, give him an opportunity for an elucidation of the origin and character of social institutions which might, with advantage, be read by present-day economists and sociologists.

Of the central contentions of the book only one may be singled out for further comment; his emphasis on the necessity of a strictly individualistic or, as he generally says, atomistic method of analysis. It has been said of him by one of his most distinguished followers that "he himself always remained an individualist in the sense of the classical economists. His successors ceased to be so." It is doubtful whether this statement is true of more than one or two instances. But in any case it fails signally to give Menger full credit for the method he actually employed. What with the classical economists had remained something of a mixture between an ethical postulate and a methodological tool, was developed by him systematically in the latter direction. And if emphasis on the subjective element has been fuller and more convincing in the writings of the members of the Austrian School than in those of any other of the founders of modern economics, this is largely due to Menger's brilliant vindication in this book.

Menger had failed to arouse the German economists with his first book. But he could not complain of neglect of his second. The direct attack on what was the only approved doctrine attracted immediate attention and provoked, among other hostile reviews, a magisterial rebuke from Gustav Schmoller, the head of the school—a rebuke couched in a tone more than usually offensive.[1] Menger accepted the challenge and replied in a passionate pamphlet, *Irrthümer des Historismus in der deutschen Nationalökonomie*, written in the form of letters to a friend, in which he ruthlessly demolished Schmoller's position. The pamphlet adds little in substance to the *Untersuchungen*. But it is the best instance of the extraordinary power and brilliance of expression which Menger could achieve when he was engaged, not on building up an academic and complicated argument, but on driving home the points of a straightforward debate.

The encounter between the masters was soon imitated by their disciples. A degree of hostility not often equalled in scientific controversy was created. The crowning offence from the Austrian point of view was given by Schmoller himself who, on the appearance of Menger's pamphlet, took the probably unprecedented step of announcing in his journal that, although he had received a copy of the book for review, he was unable to review it because he had immediately returned it to the author, and reprinting the insulting letter with which the returned copy had been accompanied.

It is necessary to realise fully the passion which this controversy aroused, and what the break with the ruling school in Germany meant to Menger and his followers, if we are to understand why the problem of the adequate methods remained the dominating concern of most of Menger's later life. Schmoller, indeed, went so far as to declare publicly that members of the " abstract " school were unfit to fill a teaching position in a German university, and his influence was quite sufficient to make this equivalent to a complete exclusion of all adherents to Menger's doctrines from academic positions in Germany. Even thirty years after the close of the controversy Germany was still less affected by the new ideas now triumphant elsewhere, than any other important country in the world.

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[1] "Zur Methodologie der Staats- und Sozialwissenschaften," in *Jahrbuch für Gesetzgebung, Verwaltung und Volkswirtschaft im deutschen Reich*, 1883. In the reprint of this article in Schmoller's *Zur Litteraturgeschichte der Staats- und Sozialwissenschaften*, 1888, the most offensive passages have been mitigated.

In spite of these attacks, however, in the six years from 1884 to 1889 there appeared in rapid succession the books which finally established the reputation of the Austrian School the world over. Böhm-Bawerk, indeed, had already in 1881 published his small but important study on *Rechte und Verhältnisse vom Standpunkt der wirtschaftlichen Güterlehre*, but it was only with the simultaneous publications of the first part of his work on capital, the *Geschichte und Kritik der Kapitalzinstheorien*, and of Wieser's *Ursprung und Hauptgesetze des wirtschaftlichen Wertes* in 1884 that it became apparent how powerful a support to Menger's doctrines had arisen in this quarter. Of these two works Wieser's was undoubtedly the more important for the further development of Menger's fundamental ideas, since it contained the essential application to the cost phenomenon, now known as Wieser's law of cost, to which reference has already been made. But two years later appeared Böhm-Bawerk's *Grundzüge einer Theorie des wirtschaftlichen Güterwertes*[1] which, although it adds little except by way of casuistic elaboration to the work of Menger and Wieser, by the great lucidity and force of its argument has probably done more than any other single work to popularise the marginal utility doctrine. In the year 1884 two of Menger's immediate pupils, V. Mataja and G. Gross, had published their interesting books on profits, and E. Sax contributed a small but acute study on the question of method in which he supported Menger in his fundamental attitude but criticised him on some points of detail.[2] In 1887 Sax made his main contribution to the development of the Austrian School by the publication of his *Grundlegung der theoretischen Staatswirtschaft*, the first and most exhaustive attempt to apply the marginal utility principle to the problems of public finance, and in the same year another of Menger's early students, Robert Meyer, entered the field with his investigation of the somewhat cognate problem of the nature of income.[3]

But the richest crop was that of the year 1889. In this year was published Böhm-Bawerk's *Positive Theorie des Kapitalzinses*, Wieser's *Natürlicher Wert*, Zuckerkandl's *Zur Theorie*

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[1] Originally a series of articles in (Conrad's) *Jahrbücher* it has recently been reprinted as No. 11 of the *Series of Reprints of Scarce Tracts in Economics and Political Science*, published by the London School of Economics (1932).

[2] V. Mataja, *Der Unternehmergewinn*, Vienna, 1884; G. Gross, *Lehre vom Unternehmergewinn*, Leipzig, 1884; E. Sax, *Das Wesen und die Aufgaben der Nationalökonomie*, Vienna, 1884.

[3] Robert Meyer, *Das Wesen des Einkommens*, Berlin, 1887.

des Preises, Komorzynski's *Wert in der isolierten Wirtschaft*, Sax's *Neueste Fortschritte der nationalökonomischen Theorie*, and H. von Schullern-Schrattenhofen's *Untersuchungen über Begriff und Wesen der Grundrente*.[1]

Perhaps the most successful early exposition of the doctrines of the Austrian School in a foreign language was M. Pantaleoni's *Pure Economics* which appeared first in the same year.[2] Of other Italian economists L. Cossa, A. Graziani and G. Mazzola accepted most or all of Menger's doctrines. Similar success attended these doctrines in Holland where the acceptance by the great Dutch economist, N. G. Pierson, of the marginal utility doctrine in his textbook (1884-1889), published later in English under the title *Principles of Economics*, had also considerable influence. In France Ch. Gide, E. Villey, Ch. Secrétan and M. Block spread the new doctrine, and in the United States S. N. Patten and Professor Richard Ely had received it with great sympathy. Even the first edition of A. Marshall's *Principles*, which appeared in 1890, showed a considerably stronger influence of Menger and his group than readers of the later editions of that great work would suspect. And in the next few years Smart and Dr. Bonar, who had already earlier shown their adherence to the school, widely popularised the work of the Austrian School in the English-speaking world.[3] But, and this brings us back to the special position of Menger's work, it was now not so much his writings as those of his pupils which continuously gained in popularity. The main reason for this was simply that Menger's *Grundsätze* had for some time been out of print and difficult to procure, and that Menger refused to permit either a reprint or a translation. He hoped to replace it soon by a much more elaborate "system" of economics and was, in any case, unwilling to have the work republished without considerable revision. But other tasks claimed his prior attention, and for years led to a continual postponement of this plan.

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[1] In the same year two other Viennese economists, R. Auspitz and R. Lieben, published their *Untersuchungen über die Theorie des Preises*, still one of the most important works of mathematical economics. But although they were strongly influenced by the work of Menger and his group, they build rather on the foundations laid by Cournot and Thünen, Gossen, Jevons and Walras than on the work of their compatriots.

[2] Maffeo Pantaleoni, *Principii di Economia Pura*, Firenze, 1889 (2nd ed. 1894), English translation, London, 1894. An unjust remark in the Italian edition accusing Menger of plagiarism of Cournot, Gossen, Jennings, and Jevons was eliminated in the English edition and Pantaleoni later made amends by editing, with an introduction from his pen, an Italian translation of the *Grundsätze*, cf. C. Menger, *Principii fondamentali di economia pura*, con prefazione di Maffeo Pantaleoni, Imola, 1909 (first published as a supplement to the *Giornale degli Economisti* in 1906 and 1907 without the preface of Pantaleoni). The preface is also reprinted in the Italian translation of the second edition of the *Grundsätze* (to be mentioned below) which was published at Bari, 1925.

[3] Cf. particularly J. Bonar, " The Austrian Economists and their Views on Value," *Quarterly Journal of Economics*, 1888, and " The Positive Theory of Capital," *ibid.*, 1889.

Menger's direct controversy with Schmoller had come to an abrupt end in 1884. But the *Methodenstreit* was carried on by others, and the problems involved continued to claim his main attention. The next occasion which induced him to make a public pronouncement on these questions was the publication, in 1885 and 1886, of a new edition of Schönberg's *Handbuch der politischen Oekonomie*, a collective work in which a number of German economists, most of them not convinced adherents to the Historical School, had combined to produce a systematic exposition of the whole field of political economy. Menger reviewed the work for a Viennese legal journal in an article which also appeared as a separate pamphlet under the title *Zur Kritik der politischen Oekonomie* (1887).[1] Its second half is largely devoted to the discussion of the classification of the different disciplines commonly grouped together under the name of political economy, a theme which, two years later, he treated more exhaustively in another article entitled *Grundzüge einer Klassifikation der Wirtschaftswissenschaften*.[2] In the intervening year, however, he published one of his two further contributions to the substance—as distinguished from the methodology—of economic theory, his important study, *Zur Theorie des Kapitals*.[3]

It is pretty certain that we owe this article to the fact that Menger did not quite agree with the definition of the term capital which was implied in the first, historical part of Böhm-Bawerk's *Capital and Interest*. The discussion is not polemical. Böhm-Bawerk's book is mentioned only to commend it. But its main aim is clearly to rehabilitate the abstract concept of capital as the money value of the property devoted to acquisitive purposes against the Smithian concept of the "produced means of production." His main argument that the distinction of the historical origin of a commodity is irrelevant from an economic point of view, as well as his emphasis on the necessity of clearly distinguishing between the rent obtained from already existing instruments of production and interest proper, refer to points which, even to-day, have not yet received quite the attention they deserve.

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[1] The original review article appeared in (Grünhut's) *Zeitschrift für das Privat- und öffentliche Recht der Gegenwart*, vol. xiv, the separate pamphlet, Vienna, 1887.

[2] See (Conrad's) *Jahrbücher für Nationalökonomie und Statistik*, N.F., vol. xix, Jena, 1889.

[3] In the same journal, N.F., vol. xvii, Jena, 1888. An abridged French translation, by Ch. Secrétan appeared in the same year in the *Revue d'Économie Politique* under the title "Contribution à la théorie du capital."

It was at about the same time, in 1889, that Menger was almost persuaded by his friends not to postpone further the publication of a new edition of the *Grundsätze*. But although he actually wrote a new preface to that new edition (excerpts from which have been printed more than thirty years later by his son in the introduction to the actual second edition), nevertheless publication was again postponed. Soon after a new set of publications emerged, which absorbed his main attention and occupied him for the next two years.

Towards the end of the 'eighties the perennial Austrian currency problem had assumed a form where a drastic final reform seemed to become both possible and necessary. In 1878 and 1879 the fall of the price of silver had first brought the depreciated paper currency back to its silver parity and soon afterwards made it necessary to discontinue the free coinage of silver; since then the Austrian paper money had gradually appreciated in terms of silver and fluctuated in terms of gold. The situation during that period—in many respects one of the most interesting in monetary history—was more and more regarded as unsatisfactory, and as the financial position of Austria seemed for the first time for a long period strong enough to promise a period of stability, the Government was generally expected to take matters in hand. Moreover, the treaty concluded with Hungary in 1887 actually provided that a commission should immediately be appointed to discuss the preparatory measures necessary to make the resumption of specie payments possible. After considerable delay, due to the usual political difficulties between the two parts of the dual monarchy, the commission, or rather commissions, one for Austria and one for Hungary, were appointed and met in March 1892, in Vienna and Budapest respectively.

The discussions of the Austrian "Währungs-Enquete-Commission", of which Menger was the most eminent member, are of considerable interest quite apart from the special historical situation with which they had to deal. As the basis of their transactions the Austrian Ministry of Finance had prepared with extraordinary care three voluminous memoranda, which contain probably the most complete collection available of documentary material for a monetary history of the preceding period which has appeared in any publication.[1] Among the members besides Menger there were other well-known economists, such as Sax, Lieben and Mataja, and a number of journalists, bankers and industrialists, such as Benedikt, Hertzka and Taussig, all of whom had a more than ordinary knowledge of monetary problems, while Böhm-Bawerk, then in the Ministry of Finance, was one of the Government representatives and vice-chairman. The task of the commission was not to prepare a report, but to hear and discuss the views of its members on a number of questions put to them by the Government.[2] These questions concerned the basis of the future currency, the retention, in the case of the adoption of the Gold Standard, of the existing silver and paper circulation, the ratio of exchange between the existing paper florin and gold, and the nature of the new unit to be adopted.

Menger's mastery of the problem, no less than his gift of clear exposition, gave him immediately a leading position in the commission and his statement attracted the widest attention. It even achieved what, for an economist, was perhaps the unique distinction of causing a temporary slump on the stock exchange. His contribution consisted not so much in his discussion of the general question of the choice of the standard —here he agreed with practically all the members of the commission that the adoption of the Gold Standard was the only practical course—but in his careful discussion on the practical problems of the exact parity to be chosen and the moment of time to be selected for the transition. It is mainly for his evaluation of these practical difficulties connected with any transition to a new standard of currency, and the survey of the different considerations that have to be taken into account, that his evidence is rightly celebrated. It has extraordinarily topical interest to-day, where similar problems have to be faced by almost all countries.[3]

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[1] *Denkschrift über den Gang der Währungsfrage seit dem Jahre* 1867.—*Denkschrift über das Papiergeldwesen der österreichisch-ungarischen Monarchie.*—*Statistische Tabellen zur Währungsfrage der österreichisch-ungarischen Monarchie.* All published by the k.k. Finanzministerium, Vienna, 1892.

[2] Cf. *Stenographische Protokolle über die vom* 8. *bis* 17. *März* 1892 *abgehaltenen Sitzungen der nach Wien einberufenen Währungs-Enquete-Commission.* Wien, k.k. Hof- und Staatsdruckerei, 1892. Shortly before the commission met Menger had already outlined the main problems in a public lecture, "Von unserer Valuta," which appeared in the *Allgemeine Juristen Zeitung*, Nos. 12 and 13 of the volume for 1892.

[3] It is unfortunately impossible, within the scope of this introduction, to devote to this important episode in currency history the space it deserves because of its close

This evidence, the first of a series of contributions to monetary problems, was the final and mature product of several years of concentration on these questions. The results of these were published in rapid succession in the course of the same year—a year during which there appeared a greater number of publications from Menger's hand than at any other period of his life. The results of his investigations into the special problems of Austria appeared as two separate pamphlets. The first, entitled *Beiträge zur Währungsfrage in Oesterreich-Ungarn*, and dealing with the history and the peculiarities of the Austrian currency problem and the general question of the standard to be adopted, is a revised reprint of a series of articles which appeared earlier in the year in Conrad's *Jahrbücher* under a different title.[1] The second, called *Der Uebergang zur Goldwährung. Untersuchungen über die Wertprobleme der österreichisch-ungarischen Valutareform* (Vienna, 1892), treats essentially the technical problems connected with the adoption of a Gold Standard, particularly the choice of the appropriate parity and the factors likely to affect the value of the currency once the transition had been made.

But the same year also saw the publication of a much more general treatment of the problems of money which was not directly concerned with the special question of the day, and which must be ranked as the third and last of Menger's main contributions to economic theory. This was the article on money in volume iii of the first edition of the *Handwörterbuch der Staatswissenschaften* which was then in the process of publication. It was his preoccupation with the extensive investigations carried out in connection with the preparation of this elaborate exposition of the general theory of money, investigations which must have occupied him for the preceding two or three years, which brought it about that the beginning of the discussion of the special Austrian problems found Menger so singularly equipped to deal with them. He had, of course, always been strongly interested in monetary problems. The last chapter of the *Grundsätze* and parts of the *Untersuchungen über die Methode* contain important contributions,

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connection with Menger and his school and because of the general interest of the problems which were discussed. It would be well worth a special study and it is very regrettable that no history of the discussions and measures of that period exists. In addition to the official publications mentioned before, the writings of Menger provide the most important material for such a study.

[1] "Die Valutaregulierung in Oesterreich-Ungarn," (Conrad's) *Jahrbücher für Nationalökonomie und Statistik*, III. F., vols. iii and iv, 1892.

particularly on the question of the origin of money. It should also be noted that, among the numerous review articles which Menger used to write for daily newspapers, particularly in his early years, there are two in 1873 which deal in great detail with J. E. Cairnes's *Essays* on the effects of the gold discoveries: in some respects Menger's later views are nearly related to those of Cairnes.[1] But while Menger's earlier contributions, particularly the introduction of the concepts of the different degrees of "saleability" of commodities as the basis for the understanding of the functions of money, would have secured him an honourable position in the history of monetary doctrines, it was only in this last major publication that he made his main contribution to the central problem of the value of money. Until the work of Professor Mises twenty years later, the direct continuation of Menger's work, this article remained the main contribution of the "Austrian School" to the theory of money. It is worth while dwelling a little on the nature of this contribution, for it is a matter on which there is still much misunderstanding. It is often thought that the Austrian contribution consists only of a somewhat mechanical attempt to apply the marginal utility principle to the problem of the value of money. But this is not so. The main Austrian achievement in this field is the consistent application to the theory of money of the peculiar subjective or individualistic approach which, indeed, underlies the marginal utility analysis, but which has a much wider and more universal significance. Such an achievement springs directly from Menger. His exposition of the meaning of the different concepts of the value of money, the causes of changes and the possibility of a measurement of this value, as well as his discussion of the factors determining the demand for money, all seem to me to represent a most significant advance beyond the traditional treatment of the quantity theory in terms of aggregates and averages. And even where, as in the case of his familiar distinction between the "inner" and the "outer" value (*innerer und äusserer Tauschwert*) of money, the actual terms employed are somewhat misleading—the distinction does not, as would appear from the terms, refer to different kinds of value but to the different forces which affect prices—the underlying concept of the problem is extraordinarily modern.

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[1] These articles appeared in the *Wiener Abendpost* (a supplement to the *Wiener Zeitung*) of April 30th and June 19th, 1873. As is the case with all the early journalistic work of Menger, they are anonymous.

With the publications of the year 1892[1] the list of Menger's major works which appeared during his lifetime comes to an abrupt end. During the remaining three decades of his life he only published occasional small articles, a complete list of which will be found in the bibliography of his writings at the end of the last volume of the present edition of his collected works. For a few years these publications were still mainly concerned with money. Of these, his lecture on *Das Goldagio und der heutige Stand der Valutareform* (1893), his article on money and coinage in Austria since 1857 in the *Oesterreichische Staatswörterbuch* (1897), and particularly the thoroughly revised edition of his article on money in volume four of the second edition of the *Handwörterbuch der Staatswissenschaften* (1900),[2] ought to be specially mentioned. The latter publications are mainly of the character of reviews, biographical notes or introductions to works published by his pupils. His last published article is an obituary of his disciple Böhm-Bawerk, who died in 1914.

The reason for this apparent inactivity is clear. Menger now wanted to concentrate entirely on the major tasks which he had set himself—the long postponed systematic work on economics, and beyond this a comprehensive treatise on the character and methods of the social sciences in general. It was to the completion of this work that his main energy was devoted and in the late 'nineties he looked forward to a publication in the near future and considerable parts were ready in a definite form. But his interests and the scope of the proposed work continued to expand to wider and wider circles. He found it necessary to go far in the study of other disciplines. Philosophy, psychology and ethnography claimed more and more of his time, and the publication of the work was again and again postponed. In 1903 he went so far as to resign from his chair at the comparatively early age of 63 in order to be able to devote himself entirely to his work.[3] But he was never satisfied and seems to have continued to work on it in the increasing seclusion of his old age until he died in 1921 at the advanced age of 81. An inspection of his manuscript has shown that, at one time, considerable parts of the work must have been ready for publication. But even after his powers had begun to fail he continued to revise and rearrange the manuscripts to such an extent that any attempt to reconstruct this would be a very difficult, if not an impossible task. Some of the material dealing with the subject-matter of the *Grundsätze* and partly intended for a new edition of this work, has been incorporated by his son in a second edition of this work, published in 1923.[1] Much more, however, remains in the form of voluminous but fragmentary and disordered manuscripts, which only the prolonged and patient efforts of a very skilful editor could make accessible. For the present, at any rate, the results of the work of Menger's later years must be regarded as lost.

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[1] In addition to those already mentioned there appeared in the same year a French article, "La Monnaie Mesure de la Valeur," in the *Revue d'Économie Politique* (vol. vi) and an English article, "On the Origin of Money," in the *Economic Journal* (vol. ii).

[2] The reprint of the same article in vol. iv of the third edition of the *Handwörterbuch* (1909) contains only small stylistic changes compared with the second edition.

[3] In consequence, almost all the living representatives of the "Austrian School," like Professors H. Mayer, L. von Mises and J. Schumpeter, were not direct pupils of Menger but of Böhm-Bawerk or Wieser.

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For one who can hardly claim to have known Carl Menger in person it is a hazardous undertaking to add to this sketch of his scientific career an appreciation of his character and personality. But as so little about him is generally known to the present generation of economists, and since there is no comprehensive literary portrait available,[2] an attempt to piece together some of the impressions recorded by his friends and students, or preserved by the oral tradition in Vienna, may not be altogether out of place. Such impressions naturally relate to the second half of his life, to the period when he had ceased to be in active contact with the world of affairs, and when he had already taken to the quiet and retired life of the scholar, divided only between his teaching and his research.

The impression left on a young man by one of those rare occasions when the almost legendary figure became accessible is well reproduced in the well-known engraving of F. Schmutzer. It is possible, indeed, that one's image of Menger owes as much to this masterly portrait as to memory. The massive, well-modelled head, with the colossal forehead and the strong but clear lines there delineated are not easily forgotten. Tall, with a wealth of hair and full beard, in his prime Menger must have been a man of extraordinarily impressive appearance.

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[1] *Grundsätze der Volkswirtschaftslehre* von Carl Menger, Zweite Auflage mit einem Geleitwort von Richard Schüller aus dem Nachlass herausgegeben von Karl Menger, Wien, 1923. A full discussion of the changes and additions made in this edition will be found in F. X. Weiss, "Zur zweiten Auflage von Carl Mengers Grundsätzen," *Zeitschrift für Volkswirtschaft und Sozialpolitik*, N.F., vol. iv, 1924.

[2] Of shorter sketches those by F. von Wieser in the *Neue österreichische Biographie*, 1923, and by R. Zuckerkandl in the *Zeitschrift für Volkswirtschaft, Sozialpolitik und Verwaltung*, vol. xix, 1911, ought to be specially mentioned.

In the years after his retirement it became a tradition that young economists entering upon an academic career undertook the pilgrimage to his home. They would be genially received by Menger among his books and drawn into conversation about the life which he had known so well, and from which he had withdrawn after it had given him all he had wanted. In a detached way he preserved a keen interest in economics and university life to the end and when, in the later years, failing eyesight had defeated the indefatigable reader, he would expect to be informed by the visitor about the work he had done. In these late years he gave the impression of a man who, after a long active life, continued his pursuits not to carry out any duty or self-imposed task, but for the sheer intellectual pleasure of moving in the element which had become his own. In his later life, perhaps, he conformed somewhat to the popular conception of the scholar who has no contact with real life. But this was not due to any limitation of his outlook. It was the result of a deliberate choice at a mature age and after rich and varied experience.

For Menger had lacked neither the opportunity nor the external signs of distinction to make him a most influential figure in public life, if he had cared. In 1900 he had been made a life member of the upper chamber of the Austrian Parliament. But he did not care sufficiently to take a very active part in its deliberations. To him the world was a subject for study much more than for action, and it was for this reason only that he had intensely enjoyed watching it at close range. In his written work one can search in vain for any expressions of his political views. Actually, he tended to conservatism or liberalism of the old type. He was not without sympathy for the movement for social reform, but social enthusiasm would never interfere with his cold reasoning. In this, as in other respects, he seems to have presented a curious contrast to his more passionate brother Anton.[1] Hence it is mainly as one of the most successful teachers at the University that Menger is best remembered by generations of students, and that he has indirectly had enormous influence on Austrian public life.[1] All reports agree in the praise of his transparent lucidity of exposition. The following account of his impression by a young American economist who attended Menger's lectures in the winter 1892-93 may be reproduced here as representative: "Professor Menger carries his fifty-three years lightly enough. In lecturing he rarely uses his notes except to verify a quotation or a date. His ideas seem to come to him as he speaks and are expressed in language so clear and simple, and emphasised with gestures so appropriate, that it is a pleasure to follow him. The student feels that he is being led instead of driven, and when a conclusion is reached it comes into his mind not as something from without, but as the obvious consequence of his own mental process. It is said that those who attend Professor Menger's lectures regularly need no other preparation for their final examination in political economy, and I can readily believe it. I have seldom, if ever, heard a lecturer who possessed the same talent for combining clearness and simplicity of statement with philosophical breadth of view. His lectures are seldom 'over the heads' of his dullest students, and yet always contain instruction for the brightest."[2] All his students retain a particularly vivid memory of the sympathetic and thorough treatment of the history of economic

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[1] The two brothers were regular members of a group which met in the 'eighties and 'nineties almost daily in a coffee-house opposite the University and which consisted originally mainly of journalists and business men, but later increasingly of Carl Menger's former pupils and students. It was through this circle that, at least until his retirement from the University, he mainly retained contact with, and exercised some influence on, current affairs. The contrast between the two brothers is well described by one of his most distinguished pupils, R. Sieghart. (Cf. the latter's *Die letzten*

Jahrzehnte einer Grossmacht, Berlin, 1932, p. 21): "Wahrlich ein seltsames und seltenes Brüderpaar die beiden Menger; Carl, Begründer der österreichischen Schule der Nationalökonomie, Entdecker des wirtschaftspsychologischen Gesetzes vom Grenznutzen, Lehrer des Kronprinzen Rudolf, in den Anfängen seiner Laufbahn auch Journalist, die grosse Welt kennend wenn auch fliehend, seine Wissenschaft revolutionierend, aber als Politiker eher konservativ; auf der anderen Seite Anton, weltfremd, seinem eigenen Fach, dem bürgerlichen Recht und Zivilprozess, bei glänzender Beherrschung der Materie immer mehr abgewandt, dafür zunehmend mit sozialen Problemen und ihrer Lösung durch den Staat befasst, glühend eingenommen von den Fragen des Sozialismus. Carl völlig klar, jederman verständlich, nach Ranke's Art abgeklärt; Anton schwieriger zu verfolgen, aber sozialen Problemen in allen ihren Erscheinungsformen—im bürgerlichen Recht, in Wirtschaft und Staat—zugewandt. Ich habe von Carl Menger die nationalökonomische Methode gelernt, aber die Probleme, die ich mir stellte, kamen aus Anton Mengers Hand."

[1] The number of men who at one time or another, belonged to the more intimate circle of Menger's pupils and later made a mark in Austrian public life is extraordinarily large. To mention only a few of those who have also contributed some form to the technical literature of economics, the names of K. Adler, St. Bauer, M. Dub, M. Ettinger, M. Garr, V. Graetz, I. von Gruber-Menninger, A. Krasny, G. Kunwald, J. Landesberger, W. Rosenberg, H. Schwarzwald, E. Schwiedland, R. Sieghart, E. Seidler and R. Thurnwald may be added to those mentioned earlier in the text.

[2] H. R. Seager, "Economics at Berlin and Vienna," *Journal of Political Economy*, vol. i, March, 1893, reprinted in *Labor and other Essays*, New York, 1931.

doctrines, and mimeographed copies of his lectures on public finance were still sought after by the student twenty years after he had retired, as the best preparation for the examinations.

His great gifts as a teacher were, however, best shown in his seminar where a select circle of advanced students and many men who had long ago taken their doctor's degree assembled. Sometimes, when practical questions were discussed, the seminar was organised on parliamentary lines with appointed main speakers *pro* and *contra* a measure. More frequently, however, a carefully prepared paper by one of the members was the basis of long discussions. Menger left the students to do most of the talking, but he took infinite pains in assisting in the preparations of the papers. Not only would he put his library completely at the disposal of the students, and even bought for them books specially needed, but he would go through the manuscript with them many times, discussing not only the main questions and the organisation of the paper, but even "teaching them elocution and the technique of breathing."[1]

For newcomers it was, at first, difficult to get into closer contact with Menger. But once he had recognised a special talent and received the student into the select circle of the seminar he would spare no pains to help him on with his work. The contact between Menger and his seminar was not confined to academic discussions. He frequently invited the seminar to a Sunday excursion into the country or asked individual students to accompany him on his fishing expeditions. Fishing, in fact, was the only pastime in which he indulged. Even here he approached the subject in the scientific spirit he brought to everything else, trying to master every detail of its technique and to be familiar with its literature.

It would be difficult to think of Menger as having a real passion which was not in some way connected with the dominating purpose of his life, the study of economics. Outside the direct study of his subject, however, there was a further preoccupation hardly less absorbing, the collection and preservation of his library. So far as its economic section is concerned this library must be ranked as one of the three or four greatest libraries ever formed by a private collector. But it comprised by no means only economics, and its collections on ethnography and philosophy were nearly as rich. After his death the greater part of this library, including all economics and ethnography, went to Japan and is now preserved as a separate part of the library of the school of economics in Tokyo. That part of the published catalogue which deals with economics alone contains more than 20,000 entries.[1]

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[1] Cf. V. Graetz, "Carl Menger," *Neues Wiener Tagblatt*, February 27th, 1921.

It was not given to Menger to realise the ambition of his later years and to finish the great treatise which, he hoped, would be the crowning achievement of his work. But he had the satisfaction of seeing his great early work bearing the richest fruit, and to the end he retained an intense and never flagging enthusiasm for the chosen object of his study. The man who is able to say, as it is reported he once said, that if he had seven sons, they should all study economics, must have been extraordinarily happy in his work. That he had the gift to inspire a similar enthusiasm in his pupils is witnessed by the host of distinguished economists who were proud to call him their master.

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[1] *Katalog der Carl Menger-Bibliothek in der Handelsuniversität Tokio.* Erster Teil. Sozialwissenschaften. Tokio, 1926 (731 pp.).

Measures of the Growth of British Industry

By Carl Snyder

DATA for a careful measure of Great Britain's extraordinary rise to the industrial and financial primacy of the world are not plentiful, but sufficient to make the picture clear. We know that it was of almost dramatic swiftness, and but little foreseen. An American commentator notes that:

> " Even as late as the middle of the eighteenth century, England's industrial future was by no means certain. The English iron output had, in fact, declined steadily for several decades—there was apparently nothing on the industrial horizon to offer hope for the British iron industry in particular, and yet it was on the verge of such an expansion as the world had never seen before, in connection with any industry in any land. . . . This great expansion was to come not only in this one great basal industry but it was to spread out, enlarging and remodelling the entire industrial structure of the country."[1]

One might add, of most other commercial nations as well. The broad picture is painted in some of its chief outlines in the first of the graphs presented herewith. There had been a slow but considerable increase in Britain's shipping in the seventeenth century. But at the end of the century the total value of annual imports and exports, even after the great rise in prices in that period, was reckoned at only around 10 millions sterling. The output of iron was but about 20,000 tons annually. And coal production extremely small. It is of interest that, as Eckel points out, at the time of the American revolt the iron output of her thinly populated American colonies was about on a parity with that of the mother country; and imports from America were considerable.

Then came an amazing change. Britain's product of iron and coal, and other metals, her shipping and her wealth, rose at a rate that no other nation had ever known. It is astonishing to note that although America has a wealth of coal and iron surpassing that of any other continent, the output of iron and coal in the United States did not again equal that of Britain until near the close of the last century. This in spite of the fact that our population had passed that of Great Britain by the time of our Civil War.

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[1] *Coal, Iron and War*, by Edwin C. Eckel, New York, 1920.

It will be seen how rapid was the increase from the time when the smelting of iron by coke was begun, the development of the steam-engine, and the inventions which ushered in the Industrial Revolution. The great period of growth undoubtedly came in the hundred years that followed the revolt of the Colonies. Singular apposition of events! It was just before this revolt that David Hume feared that the loss of the Colonies (and India) might be the ruin of British trade.

But it seems clear that in the latter half of the nineteenth century this rapid rate of growth slowed down markedly. It seems difficult to obtain enough long-time series to attempt any broad measure of the aggregate growth in the earlier period. But by the middle of the century, from 1850, this material begins to be plentiful and representative. A broad composite of this material is shown in the lower part of the first graph. From 1850 the line is projected backward to 1790 merely to offer an estimate of the probable general allure of the earlier period. This is a mathematical conjecture and nothing more.

A wide sampling of the data available from 1850 is shown on the charts which follow. The second of the graphs shows the production of minerals and metals, that is, chiefly of coal and iron, for Great Britain; railway traffic measured in tons carried, not ton miles; cargo tonnage for foreign ports, and several others. The cargo tonnage is partly estimated for the earlier period, from gross tonnage cleared. It will be seen how rapid was the growth up to about 1890; but, as is pictured in Chart I, it was still more rapid in the first half of the century.

The same general fact is depicted in the growth of urban population. In the third quarter of the century it was markedly higher than in the last quarter; and in the present century the rate of growth has been still lower. That was not true of the number of persons industrially employed; i.e. the total number officially reported, exclusive of those engaged in fishing, agriculture, and the like. Here the rate of growth was fairly steady up to the war. Data for 1930 seem not yet obtainable, but we have made an estimate, as shown on the chart, on the basis of the same rate of increase from 1920 to 1930 as urban population. Postal deliveries (number of pieces) are not available apparently back in 1850, but likewise show a steady and relatively rapid rise to the World War.

Great Britain early became a great trading nation, and this has meant a great import. A number of its chief imports, combined in the case of wool and wheat with the internal production, are shown in the third graph. The progress of the cotton industry is especially striking. It was deeply affected, of course, by our Civil War, but barring that, its growth was fairly regular up to the World War. Since that time it has undergone an actual decline. The woollen industry, on the other hand, appears to have maintained itself better, and while the consumption of recent years has been lower than the war-time and post-war peaks, it has ruled above the pre-war levels.

Sugar consumption, and likewise tobacco, it will be seen, rose steadily both before and after the war. And the same with the consumption of tea. As is shown, England is not a great coffee drinker, and its consumption of wheat has likewise increased very slowly. The growth of the population is shown on the same chart.

Some more general indices of industrial and economic growth, available from 1880, are set forth in the fourth chart, as, for example, the volume of gas sold. This seems not to have been deeply affected by the war, and to have grown pretty steadily up to 1929. The same with postal receipts, which are in gold currency. The increase in the number of telephones installed, in total electric power production, and the number of vehicles licensed, is likewise shown. With this the number of patents issued. It will be noted that in spite of the general check to British industry in post-war years, the rate of increase shown by this series was well sustained, up to 1931.

With these individual measures is likewise shown a computed trend of aggregate trade and production, closely similar to that which was computed for the United States and which I have come to regard for this country as probably the best general long-time measure of economic growth that we possess. The method of computation consists simply in taking all the industrial or economic series available, and by five-year periods computing the rate of increase for each series; and then taking a median of the middle items. These median points are then joined to produce a continuous index, on which a smooth trend is calculated, as shown.

This method, known as the chain median, has the advantage of simplicity and of giving perhaps more adequate weight and representation to the newer industries which have, as a rule, a more rapid rate of growth in the beginning. For example, by this system the extremes are automatically eliminated, no matter how many new series appear or how many old series cease to exist; the process is just the same, whether the new or the old series happen to take a middle course or show median rates of growth. The great objection which has been urged against all of our familiar aggregative indices of production, and especially of basic production, what I have called the pig-iron type, is that they are over-weighted by the older industries, and therefore, with these latter, show a bending over in recent years, that is, a slowing down of the rate of growth, which is wholly misrepresentative of the real economic growth of the country. It is one of the real mysteries that this should not be more clearly recognised by those who have attempted to make measures in this field.

We know definitely that the rate of growth in the United States of iron production and railway traffic, coal production, and all their like, was very rapid from the 'thirties and 'forties onward to the end of the century, and that many of these have slowed down now, often to little more than a population growth, that is, 1 and 2 per cent. or a little more per annum. But this does not remotely mean that the industry and energy of the United States has been correspondingly slowed down. The suggestion is, in fact, absurd; and we find somewhat the same type of indications in Great Britain.

Therefore, it is the writer's belief that British investigators in this field have likewise been misled as to the real growth of British industry or, more broadly perhaps, its general trade. While its basic industries have thus been slowing down, there seems clear evidence that its general trade, especially the non-physical lines, has not. An outstanding instance is the rate of growth of its bank clearings, when due allowance has been made for changes in the general level of prices, that is, by dividing the actual clearings by a broad composite index of what I have termed the General Price Level. This result is set forth in the seventh chart.

In the United States such an index of business growth, derived from bank clearings outside New York City, adjusted for changes in the price level, proved to be almost identical, in its rate of average increase, with the long-time index of industrial growth in this country, computed from physical measures; and very close to that of an index of the growth of manufacturing. In a word, we have in this country the clearest evidence that physical production, inevitably overweighted by basic products, is not an adequate measure of our total economic effort. The same seems likewise true of Great Britain.

In Great Britain it will be seen that the rate of growth of total London bank clearings (town, metropolitan and country) has been very considerably higher than the chain median index of trade and production described above (shown in the preceding charts). This is true even after all allowance has been made for the changes in the General Price Level. It may well be that part of this higher rate of growth in clearings is due to the steadily increasing share of purely financial and speculative transactions in London, since the country bank clearings, as will be seen, reveal a distinctly lower rate of growth. But these are not a considerable part of total clearings, as are the clearings outside of New York City in the United States; so that one can hardly assume that, as the " outside clearings " in the United States run so closely with other very elaborate measurements of general trade, precisely the same thing is true in Great Britain. How solve the problem ?

We have had recourse to the following procedure. In the United States we have now a larger and more representative number of economic series than seem available for Great Britain. When comparison is made of similar series in each country, it seems clear that the *relative* rates of growth, that is, of one series relative to another, and to the aggregate, have probably been much the same in Great Britain as in this country. This means nothing more than that in any large country of sufficiently diversified industry there are much the same characteristic elements in industrial growth—that is, the coal trade, as is obvious, tends to grow along with the iron industry, since it is so important and close an adjunct to that industry; and, in turn, the railway traffic will run very closely with both of these, since both industries contribute very largely to this traffic. And so on through other series.

Having now what we regard as really adequate and trustworthy estimates of the total economic effort in the United States, we have made use of this principle to compute similar estimates for Great Britain.

The basic series are set forth in the fifth graph. The procedure then is simply to take the ratio of the estimated total trade and production in the United States to each series in the United States, and then multiply the corresponding series for Great Britain by this ratio. We have here chosen four series, industrial employment, the growth of urban population, cargo tonnage cleared, and postal receipts, from which to compute a corresponding estimate of general trade in Great Britain. This is simply on the assumption that, for example, the growth of industrial employment (outside of agriculture) will show about the same relationship to the aggregate growth of industry, i.e. total production and trade, in one country as the other. In the same way we might attempt an estimate of the growth of railway traffic from the increase in coal and iron production where the data for these two were found for both countries, and that for railway traffic in only one.

It goes without saying that such a method has no high degree of trustworthiness for any one series. But when we may make four or five such computations, of wide diversity, and observe that they yield somewhat similar though not identical results, we may feel that we are on fairly solid ground.

The bases of these comparisons are given in Charts V and VI. The first of these, covering the period from 1850 to date, gives a comparison of the data for several characteristic and representative series, and with these the rate of increase of the population, for the two countries. In order to make this comparison more vivid in each pair of series, the data for the two countries are made equal for the year 1850. The actual data, plotted to scale, would, of course, lie differently. The comparison is made in this form simply to reveal as clearly as possible the difference in the *rates of growth*.

From a slightly different point of view, it is of high interest to compare not merely the actual rates of growth for the two countries, but the *per capita* rates of growth. This is done in Chart VI. Here the available series make it possible to carry back the estimates to 1820 and, as in the other case, the data for each of the companion series are equated at the beginning date, so that the eye may more readily compute directly from the chart the difference in these rates of growth.

These pictures reveal that while the rates of growth in the two countries have differed widely, as have likewise their rates of growth in population, each shows the dominating element of more or less continuous, and as a rule steady, increase. This is so well known as regards population that it seems needless to insist upon the same characteristic throughout all the fields of industry. But in general statistical research in this field has been so intent upon discovering what have come to be known as business " cycles," or trade disturbances, that this persistent growth element has been forced very much into the background. As a matter of fact, it now seems clear that the growth element is the dominating and vital factor, and that the variations from this persistent rate of growth are, for the most part, of a minor character and, for the most part, of relatively slight importance ; naturally excepting such a world-wide and unexampled depression as that of the last four years.

Of the various series available for comparison between the United States and Great Britain, for the purpose of estimating the growth of aggregate trade and production, the results from four that have seemed the most reliable are given in Chart VII. These four represent diverse phases and it is not surprising, therefore, that they show somewhat different rates of increase. A geometric average of these four is shown on the line below. With this, for comparison, the growth of trade as computed from the five-year chain medians. It is the writer's belief that this geometric average is probably a closer estimate of the real growth of Britain's trade than can be gained from any composite derived from physical series alone.

Below these, on the same chart, are shown the increase of clearings of the London banks and, separately, country clearings only. Both of these are divided by a computed Index of the General Price Level, the latter a revision of an index which we calculated several years ago, given by Mr. Keynes in the first volume of his *A Treatise on Money*, and later adopted by the Statistical Department of the Bank of England for the purpose of adjusting bank clearings in the manner here shown. This revised Index of the General Price Level, now computed back to 1850, will be described and discussed in another paper.

One thing regarding these measures of aggregate growth is of especial interest. As I have elsewhere set forth, in the United States, so far as the most careful and wide-ranging measures will disclose, there appears to have been no material change in the rate of our industrial growth, *per capita*, decennium by decennium, through the last hundred years and more. This was an astonishing finding and one that is widely at variance with a vast number of notions upon this subject. But the burden of proof will now be upon those who still hold to these notions, that these measures are wrong or untrustworthy. Until that proof is forthcoming, the results must stand.

Now when we come to compare this estimate of *per capita* growth in the United States with that of Great Britain, using practically the same types of measures in each case, we find that the *per capita rate of increase* for Great Britain has been slowly declining through the last hundred years. These measures, of course, relate largely to rates of physical growth. What has sustained the wealth and financial power of Great Britain is the marked development in her non-physical activities, in the field of insurance, banking, shipping, and general exchange.

It may be asked: What is the point and purpose of all these laborious calculations and a collection of data which has often required long research to obtain. Is it mere curiosity?

First of all they may go some way toward dispelling that vast cloud of fantasy and conjecture which has enveloped these subjects, though this may be the part of optimism. But these measures and others for the United States, and the composites of world production, had the more definite aim of attempting a purely statistical solution of the vexed and disturbing problem of the relations of money, credit and trade. There seem to be only two countries in which such an attempt might offer some chance of success, Great Britain and the United States.

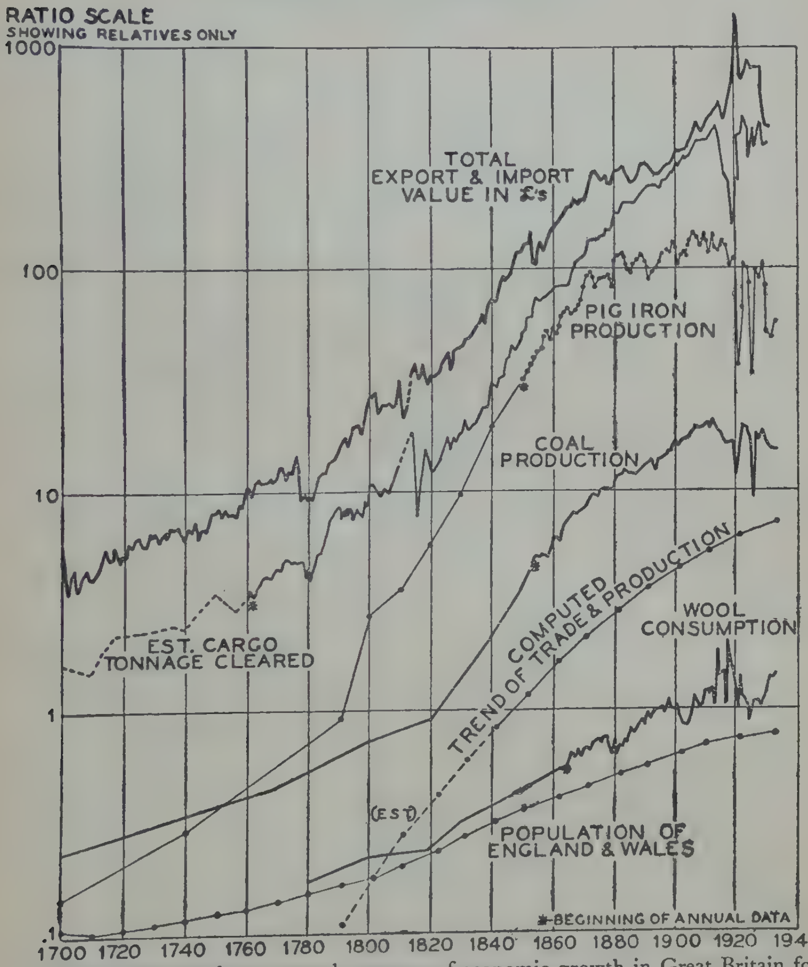
Great Britain is the only other country than the United States with a highly developed system of bank credit, as the mainstay and mainspring of industry and industrial growth. Likewise it is only in England that the use of "currency," that is, hand-to-hand money, has been so largely replaced by the use of bank cheques, as in the United States. In Great Britain, as in the latter, it is estimated that something like 90 to 95 per cent., or perhaps more, of the total of business transactions has been done by bank cheques. In both countries the amount of actual currency in circulation is relatively negligible.

If classical monetary theory, as developed by Ricardo and Mill more than a century ago, is sound, it would follow that there is a definite relationship between the volume of trade, the volume of bank credit, the rate of its turnover or "velocity," and the general level of prices. We have found in the United States a quite remarkable statistical verification of this theory.

Chart I

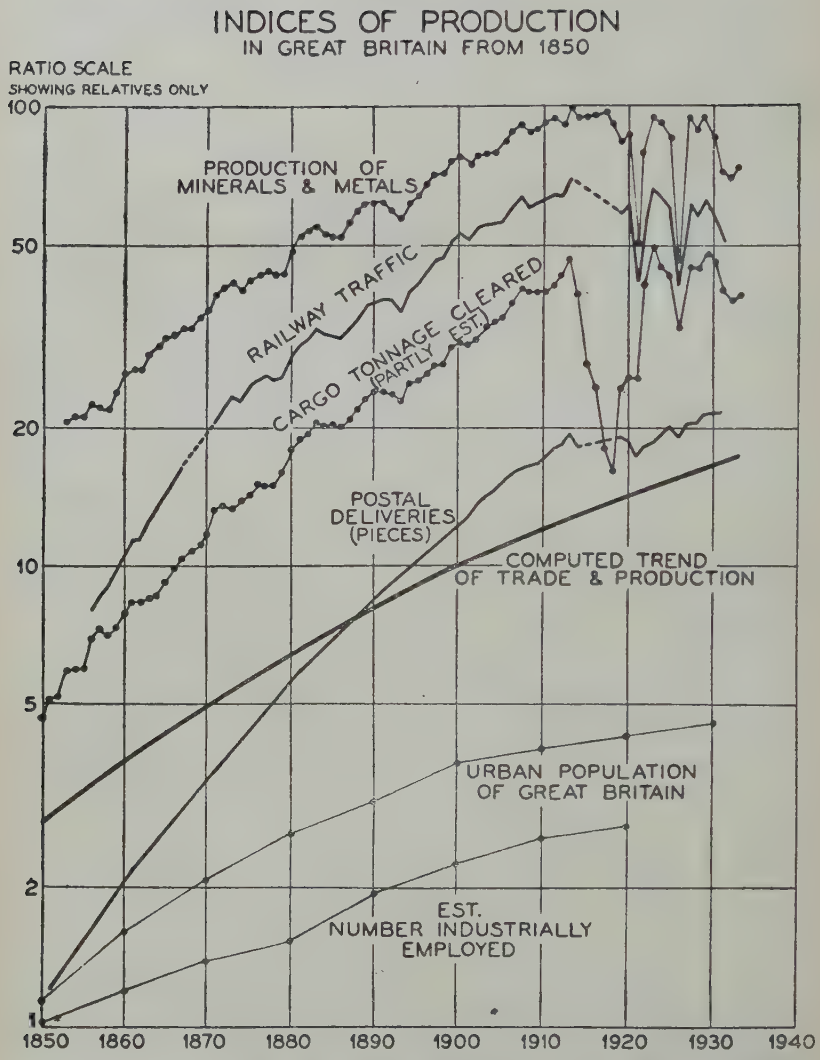
LONG TERM GROWTH OF INDUSTRY AND TRADE

IN GREAT BRITAIN FROM 1700



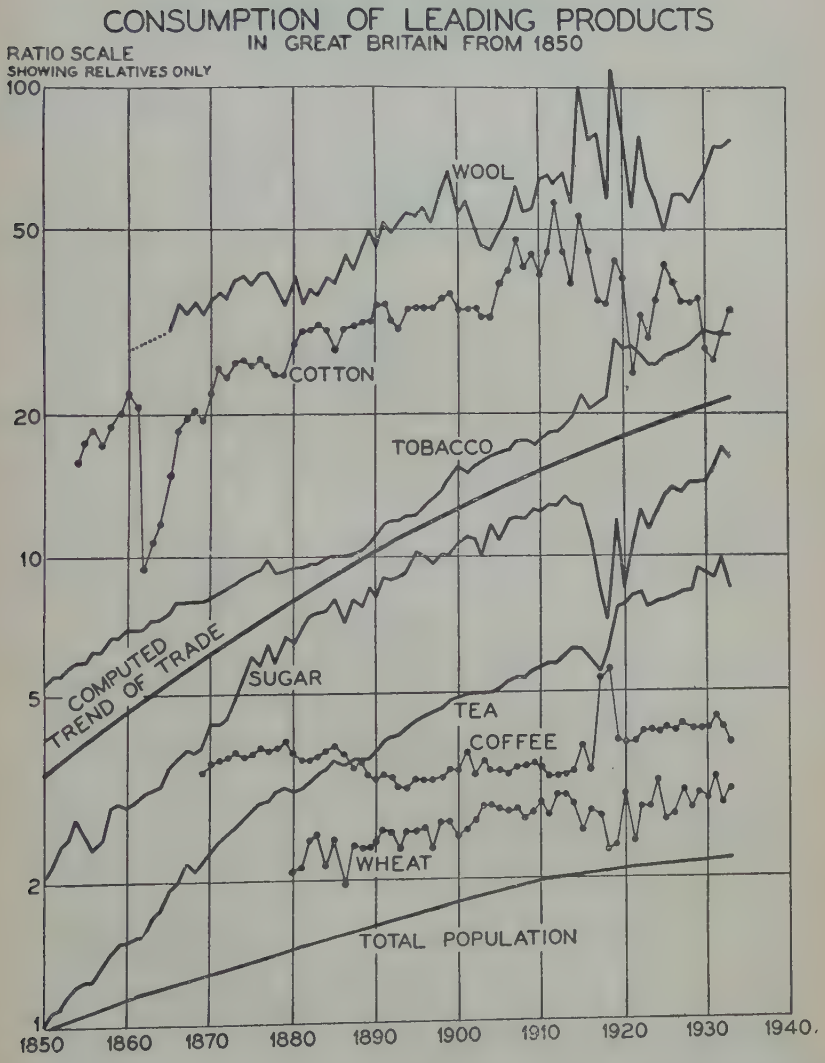
In this diagram are shown several measures of economic growth in Great Britain for over two and a quarter centuries, revealing the rather gradual development up to about 1770 or the beginnings of the industrial revolution, then a more rapid increase for almost a hundred years and latterly a decrescence. The most extended series are those of international trade, the cargo tonnage of vessels cleared for foreign ports (estimated in earlier years from gross tonnage), and the value in pounds sterling of the total foreign trade, available for the most part annually throughout. The earlier estimates, at irregular intervals, of pig iron and coal production and of wool consumption are chiefly from Mulhall. The computed trend of trade and production is calculated on an index of chain medians by five-year periods, from 1850 to 1930, of a number of individual series (shown principally in the three following charts); for the mathematical determination of the trend, the years 1870 to 1930 (omitting 1920) were included, and this formula was used in the retrojection of the line to 1790.

CHART II



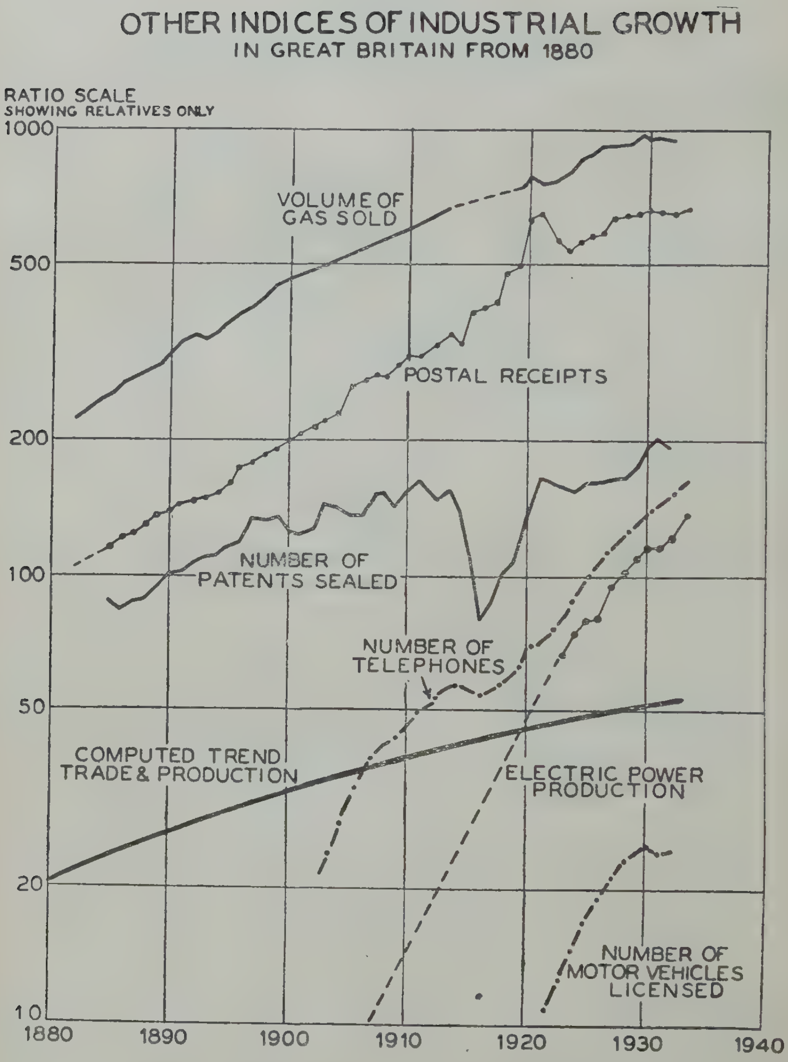
This chart shows for Great Britain several available measures of long-term growth of trade and production: (1) an annual index from 1853 of production and *or* consumption of basic minerals and metals, compiled by this department; (2) tonnage of freight carried on the railways (adjusted from 1913 to make series comparable) annually from 1856, with two gaps; (3) cargo tonnage of vessels cleared for foreign ports (est. in earlier years from gross tonnage cleared) annually from 1850 (tonnage of vessels employed by the Government during the World War excluded); (4) number of postal deliveries of letters, papers, etc., decennially to 1901 and annually thereafter, excepting in war years; (5) urban population by ten-year periods from 1851; (6) number industrially employed (*i.e.* in all other pursuits than agriculture, fishing and the like); (7) trend of trade and production, described in Chart I.

CHART III



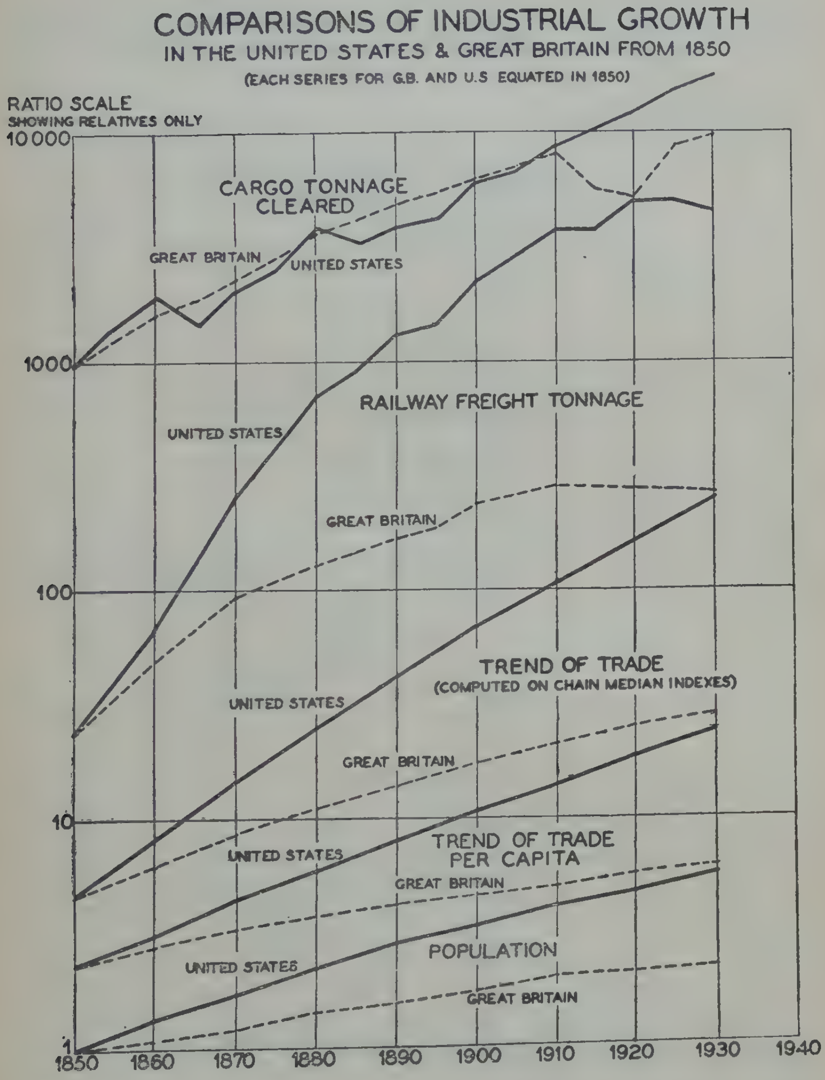
The above chart shows the quantities of important commodities largely imported and retained for home consumption in Great Britain, compared with the computed trend of trade (described in Chart I) and the total population. Series available are as follows: tea, sugar and tobacco from 1850 annually; net imports of cotton by years from 1854; wool consumption (including domestic production) from 1865 annually; consumption of coffee and wheat and wheat flour annually from 1869 and 1880, respectively.

CHART IV



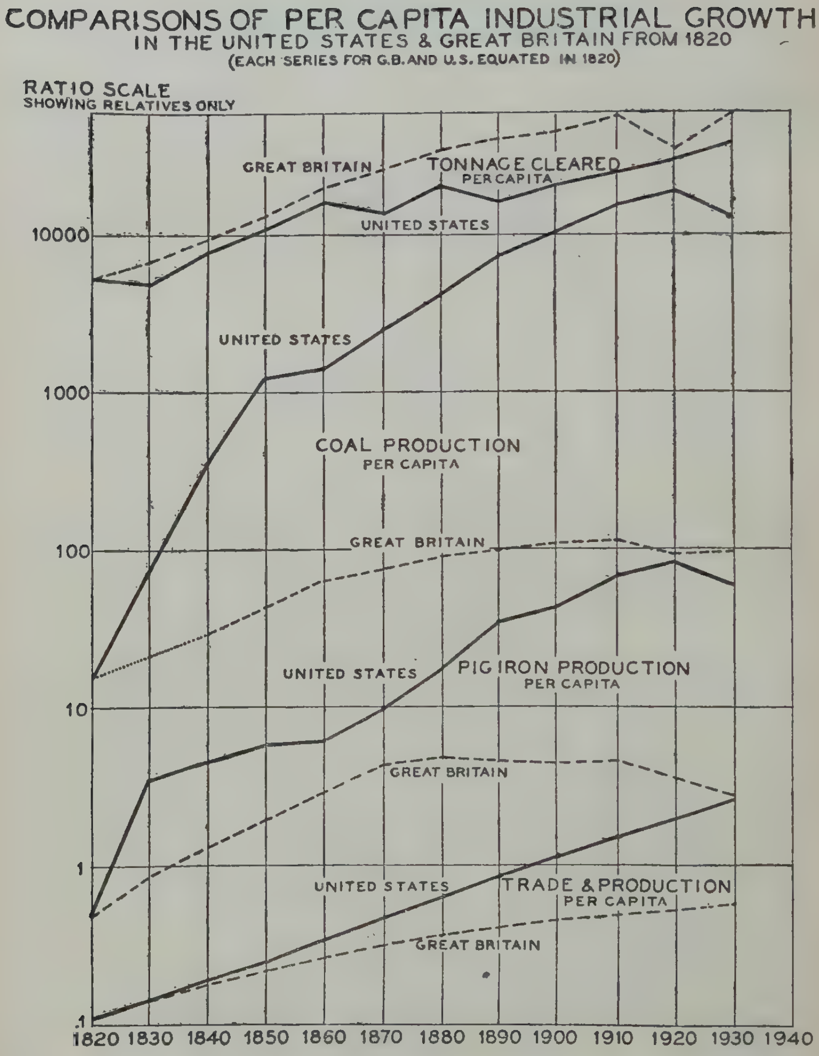
This chart illustrates industrial growth in Great Britain as indicated by six series available since 1880; the total quantity of gas sold by all authorised undertakings, annually from 1882, excepting war years; postal receipts, in gold currency, and number of patents sealed, yearly from 1885; number of telephones by years from 1903; electric power production estimated for 1907, and from 1923 annually; number of motor vehicles licensed from 1922 as on August 31st each year. With these is compared the portion from 1880 of the computed trend of trade and production described in Chart I.

CHART V



This diagram shows several series comparing the relative development since 1850 of Great Britain and the United States. The wide difference between the growth of the national (or domestic) and the international trade of the two countries may be seen from the comparisons of the freight carried on the railroads and the tonnage cleared for foreign ports. In all other series than in tonnage cleared, the United States has progressed more rapidly from 1850 throughout than Great Britain. The trends of trade are computed for the two countries by the same method and on somewhat comparable physical data,

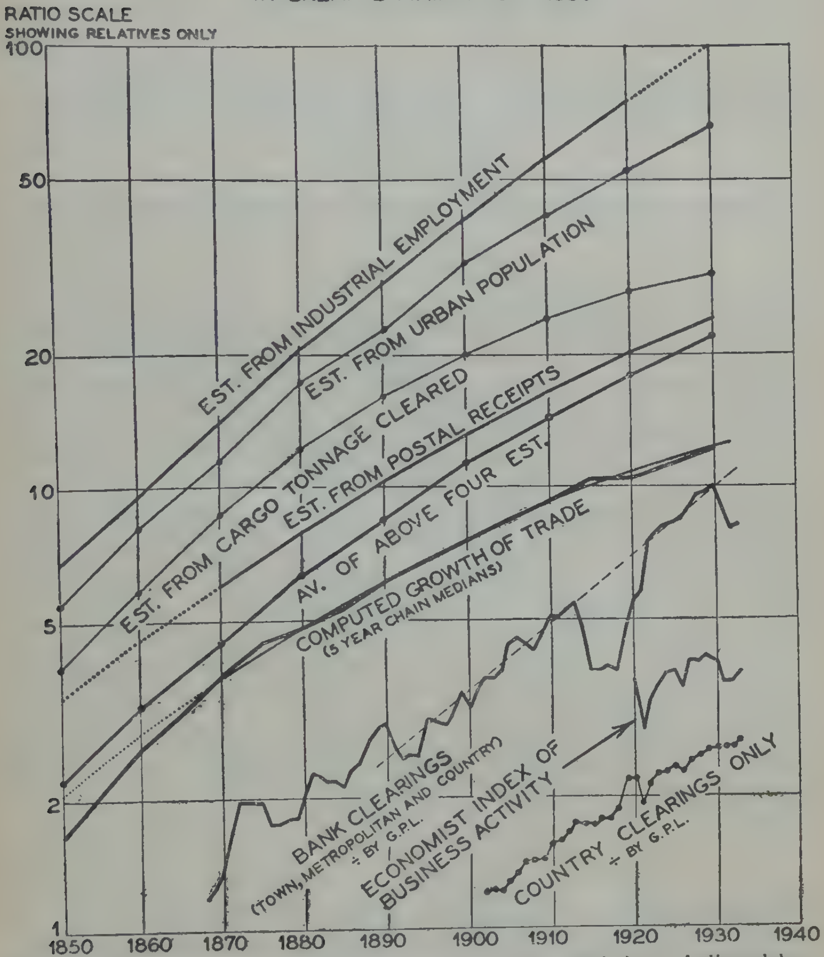
CHART VI



This chart compares by ten-year periods the long-time increase *per capita* of four representative series available for Great Britain and the United States from 1820. As in the preceding diagram, for a more striking comparison of their growth, the relative figures in the two countries for each pair of series are equated in the initial year. It may be seen that even on a *per capita* basis, all of the series except tonnage cleared have shown a generally lower rate of increase in Great Britain than in the United States.

CHART VII

ESTIMATES OF GROWTH OF TRADE
IN GREAT BRITAIN FROM 1850



This chart shows measures of industrial growth in Great Britain, as indicated by a variety of series. The four estimates are based on relative changes in Great Britain compared with other countries: ratio of (1) industrial employment in Great Britain to that in the United States, (2) urban population in Great Britain to that of the United States, (3) postal receipts (in gold currency) in Great Britain to those of the United States, each *multiplied by* the computed trend of trade and production in the United States; (4) the ratio of tonnage cleared from British ports for foreign ports to an aggregate of tonnage cleared from leading commercial nations *multiplied by* an estimated trend of world production and trade. A geometric average was made of these four estimates smoothed or projected. With these estimates, are shown for comparison: the computed trend of trade and production described in Chart I; bank clearings (town, metropolitan, and country) and country clearings only *divided by* the Index of the General Price Level shown in Chart VI, from 1868 and 1902, respectively; and the recently computed Economist index of business activity from 1920.

Notes on the Pure Theory of Public Finance

(*Suggested by the ' Ottima Imposta ' of Professor Einaudi*).

By F. C. Benham

The theory of Public Finance has received more attention in Italy than in any other country. Some fifty years ago a few Italian economists, including De Viti de Marco and Pantaleoni, laid the foundations of a pure science of Public Finance which would be a part of the equilibrium approach to economic theory. Since then their work has been continued. De Viti de Marco is happily still writing. Among the other contemporary Italian writers on this subject, his pupil, Professor Luigi Einaudi, fills a leading place. The present article is a discussion of his essay entitled, "*Contributo alla ricerca della ' ottima imposta '*." This essay raises questions of methodology which have not received in English-speaking countries the attention they deserve. It also contains an excellent analysis of the disputed question whether an income-tax on gained income " discriminates against " saving. It therefore seems well worth discussion.

I

I begin with a very brief summary of the main thesis of the *Contributo alla ricerca della " ottima imposta "* of Professor Luigi Einaudi.[1]

The main object of the essay is to consider what tax, or tax-system, is optimum. " That tax is optimum which, in a given place and time, achieves the best satisfaction of public needs compatible with a more abundant flow of national income. That tax is optimum, which is adapted to the pre-existing economic equilibrium and disturbs it least, providing with a minimum of friction the greatest revenue for the State and the greatest increment of private income. That tax is optimum which does not diminish, but increases, the size of the national income relatively to what it would be without the tax."[1]

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[1] In *Annali di Economia*, Vol. V, Nos. I and II, July 1929. All page references are to this.

The optimum tax will be equal, or neutral, or stable. The State must not tax one portion of income differently from another portion.[2] The State must have no special economic, moral, political, or social axe to grind.[3] Nobody must be induced to disturb the existing economic equilibrium solely on account of the tax.[4]

The essay is on the pure theory of the subject, and consists of logical reasoning. Secondary considerations, such as the concrete difficulties which may be met in trying to apply the optimum tax, are left on one side.[5]

Einaudi then examines the effects of a tax on gained income: the current system. Suppose a proportional tax of 10 per cent. and a rate of interest of 5 per cent. Tizio has a gained income of 10,000. He divides it into two halves, 5,000 destined for immediate consumption and 5,000 for saving. The 5,000 consumed is reduced by the 10 per cent. tax to 4,500, and all finishes there. The other 5,000 is taxed 10 per cent., reducing it to 4,500, which yields at 5 per cent. an annual income of 225. But this 225 is then subjected to a tax of 10 per cent., reducing it to 202·5. At a rate of interest of 5 per cent., 202·5 a year is equivalent to a present value of 4,050. Thus one portion of income is taxed more heavily than the other. Taxpayers are given the alternative of possessing and enjoying either 4,500 or 4,050. Manifestly the situation is unstable, and cannot last.[6] Probably less will be saved, and the future flow of national income thereby reduced.

Einaudi shows, with the aid of illustrative examples, how such a tax creates an unstable situation between producers in long "productive cycles" and those in short. The State divides time into artificial cycles of one year each, but real cycles may be of different length for different people. Suppose no instrumental goods exist, for the person concerned, at the beginning of the cycle and that all are used up during the cycle. Tizio, with a one-year cycle, produces 30 a year and is taxed 3 a year. Assume a rate of interest of 10 per cent. The first 3 equals 3·63 at the end of the third year and the second 3 equals 3·30. Tizio pays in taxation a sum equivalent to 9·93 at the end of the third year. Now consider Caio, with a three-year cycle. At the end of the first year he has produced 30, on which he pays 3, equivalent to 3·63 at the end of the third year. At the end of the second year this 30 has grown to 63, and he pays 10 per cent. tax on the difference of 33, a tax of 3·30, equivalent to 3·63 at the end of the third year. By the end of the third year the 63 has grown to 99·30, and the tax is 10 per cent. of 36·30, that is 3·63. Thus Caio pays in taxation amounts equivalent to 10·89 at the end of the third year. This system of taxation strikes those engaged in longer cycles more heavily than those engaged in shorter cycles: the longer the cycle, the greater the differentiation.

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[1] p. 75. [2] pp. 34 and 42. [3] p. 74. [4] p. 75. [5] p. 59 note. [6] p. 135.

Similarly as between debtor and creditor.[1] The creditor who lends a part of his income and receives it back later plus interest is taxed on his whole gained income each year and on the interest in the year when he receives it. The debtor is taxed on his whole gained income each year, less the interest in the year when he pays it.

"We must conclude that a tax on gained income produces effects not desirable for the community."[2] It is not an optimum tax.

Einaudi shows, by examples, that a tax on consumed income on the contrary, is equal, neutral, stable, and optimum.[3]

Einaudi explains, by means of arithmetical illustrations, the various ways in which a new equilibrium may be established as the result of a tax on gained income. There is no need to follow him in his detailed analysis of this question. I think a simple diagram will suffice for our purpose.

We can take it for granted that the demand curve for (new) savings will slope downwards. Its slope will depend, of course, on the marginal productivity of capital and on the demand schedule for consumption loans. We may assume also that over the relevant range the corresponding supply curve slopes upwards.[4] For convenience I show both curves as straight lines.

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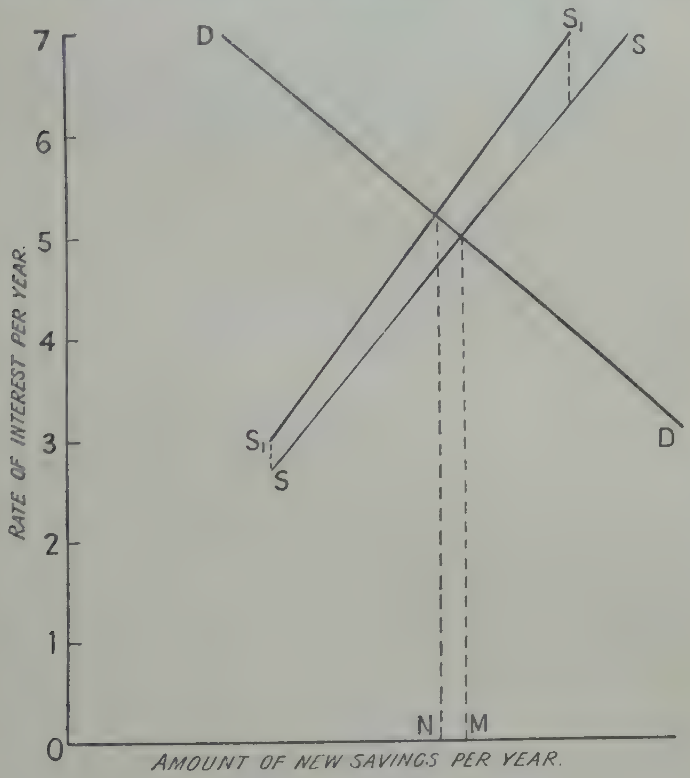
[1] p. 147.

[2] p. 175.

[3] There is, indeed, a curious section (pp. 213-24) in which Einaudi argues that it would be desirable to tax the "rents" of savers, but that this is impossible. These "rents" are simply an aspect of consumers surplus and are open to the well-known objections to this concept. If the market rate of interest is 5 per cent. and A would be prepared to save what he actually does save if the rate were only 2 per cent., the extra 3 per cent. constitutes a "rent" to A. But it seems unlikely that the market rate of interest will have no influence upon A's division of his income between saving and spending; if he gets a "rent" he will probably save more until the "rent" disappears: until his own scales of preference conform to the scale of the market.

[4] See Marshall, *Principles*, IV, vii, 9, p. 234-5.

Suppose, before the tax, equilibrium at 5 per cent. with O M supplied and demanded each year. A 10 per cent. tax on gained income reduces the expected yield by one-tenth. Thus a yield of 3 per cent. is reduced, from the standpoint of the saver, to 2·70 and one of 7 per cent. to 6·30. If their supply schedules remain the same,[1] the amount now supplied at 3 per cent. will be that shown on the curve as supplied at 2·70, and so on. We can represent this by a new curve S′S′. This will cut the demand curve at a higher point than SS, say at 5·20 per cent. This will be the new rate of interest. The amount supplied will be reduced to O N, and the time-structure of production shortened accordingly. The State will receive 0·52 of the 5·20 yielded each year by each 100 and the saver will receive 4·68. This statement ignores the



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[1] Amount saved is a function of income, as well as of the expected return. The tax reduces the incomes of savers and therefore the amount saved may fall off for a double reason: reduced inducement and reduced means. This does not affect the argument.

expenditure of the tax receipts by the State. We shall return to that point later.

The foregoing summary gives no conception of the brilliance and charm of the "*ottima imposta*," nor of the thoroughness with which each stage in the argument is developed. Here, as in his other valuable writings, Einaudi shows himself a master of logical analysis and presentation. Nevertheless, I think some comments may be made.

In the next section, I shall try to refute certain objections to the view that a tax on gained income involves "double taxation" of savings. The subject of the subsequent sections can be explained best if we consider the "*ottima imposta*" to contain:

(1) A definition of "the best tax."
(2) An analysis of the comparative effects of
    (*a*) a tax on gained income and
    (*b*) a tax on consumed income.
(3) A conclusion: namely, that (*b*) is a better tax than (*a*).

I accept (2), the analysis. It is this which occupies most of the book, and in my view it is the most complete and satisfactory account of the subject which exists.

The third section of these Notes considers (1). It is there urged that Einaudi's definitions, taken literally, are not consistent with one another.

The fourth section considers the difficulties of comparing taxes in order to discover by analysis which tax achieves some given end in the greatest measure. Einaudi's main definition of "the best tax" is considered in the light of this discussion.

The fifth section contends that we should not take Einaudi's definitions quite literally, and develops the concept which he certainly had in mind: that of "neutral" taxation.

The last section urges that, even so, his conclusion does not necessarily follow.

II

In England, controversy has centred around the phrase "the double taxation of savings." The word "double" is perhaps unfortunate. It suggests that a given sum of money which is saved out of income pays exactly twice as much in taxation as an equal sum which is spent. This need not be so, for capital can always be withdrawn and spent, and further taxations of its fruits thereby evaded. Yet it seems clear that the phrase " double taxation " is justified. Given a permanent rate of interest of, say, 5 per cent., then at any moment 100 now and 5 a year for ever are different ways of expressing the same thing. At any moment the one can be transformed into the other. To tax first the 100[1] and then the 5 a year in addition *is* " double taxation " in the sense of taxing the same thing more than once. In real terms, it is " double taxation " to tax both an instrumental good and the consumer's goods which it produces. Einaudi shows that a bow used only for killing deer transforms itself fractionally, as it wears out, into deer. Fundamentally the bow and the deer are not two goods, but one.

I shall consider three objections which have been made to this doctrine, namely:

(1) that there is no reason why double taxation should not be levied.
(2) that a differential between lending and spending at any time does not exist and
(3) that a tax on consumed income involves just as much double taxation as a tax on gained income.

The most recent statement of the first objection has been made by Mr. Donald Weaver.[2] He criticises the statement that " the saved part of income is taxed on its fruits." This, he says, " is simply a roundabout and somewhat medievalistic form of words to express the unquestioned fact that the *fruits* of the saved part of the income *are taxed*. . . . And why should not the fruits be taxed ? "

This objection is really an inquiry why we should not divide time into years, define income as income gained during a year, and tax the income as so defined. The answer, as Einaudi points out, is that the definition of income must be our point of arrival and not our point of departure.

The second objection is made by Mr. Weaver in the same article. He says: " a differential between lending and spending at any time . . . does not exist. Surely an ordinary consideration of human behaviour, in disposing of one's current income through alternative channels of lending and spending, made in the light of marginal analysis, will justify this conclusion." In the same way, it might be said that if there is a tax only on whisky, a differential between spending on whisky and spending on other things does not exist. This objection merely implies that an equilibrium may be established which takes account of an obstacle to certain actions which has been introduced by the State.

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[1] We must suppose the tax is paid out of other income.

[2] *Economic Journal*, September 1932, under the title " An Economic Fallacy : The Double Taxation of Savings."

The third objection arises from the form in which the doctrine has been presented by Professor Pigou.[1] Professor Pigou contrasts a permanent general expenditure tax on consumption goods (i.e. a tax on consumed income) with a permanent general income-tax (i.e. a tax on gained income). He says: " Under the former, resources that are saved are taxed indirectly, through their subsequent yield, to the same extent as resources that are consumed at once. There is, therefore, no differentiation of any kind. An income-tax, on the other hand, differentiates against saving, by striking savings both when they are made and also when they yield their fruits."

It is clear that Professor Pigou is assuming that savings are never withdrawn to be spent. But it can be urged that in order to make a complete comparison between the two taxes in question, we must consider the whole cycle—accumulation of capital, receipt and expenditure of interest, and withdrawal and expenditure of capital. It then seems that if an income-tax can be said to strike savings twice, so can a general expenditure tax. The former strikes them when they are made, and when interest on them is received, but not when they are withdrawn and spent. The latter does not strike them when they are made, but it does strike them both when interest on them is spent and when the savings are withdrawn and spent.[2] Sir Josiah Stamp[3] puts the point quite plainly. " Let us assume that a man saves £100 and at the end of ten years has had £5 per annum and still having his £100 he then spends it. He pays tax in all upon £150, either under the present system, when his tax is on the £100 at first and the £50 by annual instalments afterwards, or under an alternative system of taxation on expenditure, where he pays on £5 per year for ten years and on £100 in the tenth."

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[1] *A Study in Public Finance*, Part II, Ch. X.

[2] A minor point is that, if we consider the whole cycle, an income-tax with exemption for savings is by no means equivalent to a general expenditure tax (on consumers' goods). Professor Pigou implies that it is, but he must be tacitly assuming that savings are never withdrawn. For the former would strike savings neither when they were made nor when they were withdrawn and spent. It would strike only the interest from them, and it would strike that only if it were spent during the year it was received instead of being (temporarily) saved.

[3] *The Principles of Taxation*, p. 58.

This objection would not be made by any reader of Einaudi. In his illustrative examples tax payments made at different times are all equated, by applying the rate of interest assumed current, to one single point of time. Only so can they be reduced to a common measure, and added or compared. 10 per cent. of £150 is always £15. But £15 of which £10 is paid in Year 1 and 10s. in each of the ten succeeding years is not the same thing as £15 of which 10s. is paid in each of ten years and £10 at the end of Year 10. They are equal only when the rate of interest is zero; when it is positive, the former payments exceed the latter. At a rate of interest of *r* per cent., £100 now equals £*r* a year for any number of years plus £100 at the end, so that Sir Josiah Stamp's example does *not* show "double taxation" under a system of taxation upon expenditure.

III

We have seen that Einaudi gives several definitions of the optimum tax which he seeks. He believes that the various definitions are all consistent with one another, that each represents a different aspect of the same thing. He chooses the adjective "optimum" rather than "equal," "neutral," or "stable," but he believes that all four, as he defines them, are exactly equivalent. This is not so, if we take his definitions strictly *au pied de la lettre*.[1]

An equal tax-system, as he defines it, taxes every portion of income to the same extent. An optimum tax-system, as he defines it, maximises the future flow of income. The two are not necessarily consistent with one another. Einaudi asserts that an optimum tax exempts repairs, renewals and replacements made to keep physical capital intact.[2] By the same reasoning, it should exempt repairs, renewals and replacements made to keep human capital intact. The minimum income needed to maintain the efficiency of a worker should be exempted. If machines owned men, and the question were regarded from the standpoint of the machines, this would be obvious. Yet if one method gives a greater product than another, it does so irrespective of the ownership of the factors. It is true that motives may play a part. It might be argued that if all workers received much more than this minimum, their wants would induce them to spend at least this minimum in ways which maintained their efficiency. But the scales of preference of workers, as between necessaries for efficiency and so-called " conventional necessities " or " luxuries " might be such that they would require an income of, say, $2x$ in order to induce them to spend the minimum of x required to maintain their efficiency. If so, an appeal to motives would suggest an exemption of $2x$ rather than x. In any case, is it legitimate to suppose that all workers do receive more than this minimum? If not, there may be a clear conflict between two of Einaudi's definitions: between his principle of Equality and his Optimum Tax.

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[1] To do this is to be somewhat unfair to Einaudi, as will be shown later. The object of this section is not to criticise Einaudi but to pave the way for the concept of "neutral" taxation.

[2] p. 99.

Moreover, there seems no *a priori* reason why two persons with equal incomes should pay equal sums towards State services, any more than they should pay equal sums per year for bread. The desire either for State services or for bread may stand higher in the scale of preferences of one person than in that of the other. Einaudi doubtless assumes that the State services are all instrumental goods which help to produce the flow of consumers' goods and that each person enjoys them in proportion to his consumed income and that therefore two persons with equal consumed incomes should pay equal amounts in taxation. But this assumption begs the main question at issue.

Again, a harsh critic might urge that " stable " and " optimum " tax-systems, as defined by Einaudi, are not necessarily consistent with one another. A tax on gained income, says Einaudi, is not stable. It introduces disturbances into the existing economic equilibrium. But Einaudi himself shows at length how a new equilibrium will be established; and this new equilibrium will be stable, as far as disturbances arising from the tax-system are concerned, as long as the tax-system remains unaltered. If the tax-system is changed the equilibrium will be disturbed and a new one established; and this applies even if the change is brought about by the substitution of the optimum system of taxation for the existing one.

Finally, " neutral " and " optimum " may be inconsistent with one another. An optimum tax-system, designed to maximise the flow of national income, will be neutral in Einaudi's sense only if the tax-payers accept and desire this end. If they do not, then the State will be acting against their wishes in imposing the optimum tax-system. It will be optimum, in Einaudi's sense, but it will not also be neutral.

The assertion that one end is more desirable than another is, of course, a value-judgment. But it may be possible for an economist to take some end as given and try to discover, purely by analysis, how it can be achieved. Let us consider under what conditions this is possible, and whether Einaudi's main definition of his assumed end fulfils them.

IV

If we know whither different roads lead we can say which road leads to a given destination, or which road leads to it more directly.

If the economist can analyse the effects of different systems of Public Finance, can he not say which system will achieve some given end or which system will achieve it in the greatest measure ?

This would be possible only under three conditions, namely: (1) if the end were stated in a quite unambiguous manner, (2) if the end postulated were the sole end desired by whoever postulated it, and (3) if a certain system achieved that end without also producing some other effects. Only one end fulfils these three conditions; that of "neutrality." Before discussing it, I shall try to show briefly how other ends fail to fulfil them.

It may be possible to find ends which satisfy the first condition. For example, "the equalisation of the money incomes of every person in the community" could perhaps be defined unambiguously. Thus money income could be measured as the Income Tax authorities at a particular time measured it. "Person" could be defined to include every man, woman and child; and definite instructions could be given for dealing with the incomes of institutions, such as colleges, and emigration and immigration could be prohibited. Again, the end might be "to increase the total money income accruing to persons under thirty relatively to the total money income accruing to persons over sixty, measuring the increase by the absolute change in the absolute difference between the two totals."

Such ends may be free from ambiguity; but they do not fulfil the second and third conditions. No important body of opinion wishes *only* to equalise incomes. What if the equalisation involved the death by starvation of half the existing population ? In general, the end of preserving the community against external and internal aggression and the end of preserving at least a certain minimum standard of living are usually desired by those who postulate some third end; and, while the third end may be unambiguous, these other two are not. Further, any system which achieves some unambiguous end, always excepting that of " neutrality," will have other effects as well: for example, effects on productivity; and different systems which achieve the same end must have different additional effects. Thus an economist who, like Einaudi, wishes to keep his analysis free from his own value-judgments can do no more, in such circumstances, than set out the whole effects (under different assumptions) of different systems.

Any end, always excepting that of " neutrality," which fulfils the second and third conditions will fail to fulfil the first. This is obviously true of such ends as maximising happiness or welfare or utility or social advantage. Yet any end which fulfils the second and third conditions must be stated in some such vague and general terms: in terms, that is, which preclude objective measurement (whether in " cardinal " or " ordinal " numbers).

Sometimes an attempt is made to overcome this difficulty by giving a list of measurable indices by which to measure a concept in itself vague and unmeasurable, such as " welfare." But even if every such index were unambiguous, and this seems impossible, the difficulty would not be solved. There remains the problem of weighting the indices. Different systems will change different indices by different amounts and in different proportions; for example, one system will increase production more and diminish inequality of incomes less than another. Again, the economist can only analyse the effects of different systems in terms of the various indices and leave the value-judgment, the decision which system is most desirable, to his readers.

We have seen that Einaudi postulates several ends, which may be inconsistent with one another and which raise the problem of weighting. Let us select the end which he seems to stress most, namely, the increase of national income. Is this free from ambiguity ?

It may be possible to give exact, if arbitrary, instructions how to measure the national income in terms of money. A large population with a low income per head may have a larger national income than a small population with a high income per head. But " the national income per head of population " can be substituted, if desired, for " the national income." Yet, upon either definition, it is clearly not the *money* national income which is meant : if so, inflation would be the solution. Income in terms of utility cannot be measured. Presumably, we must consider " real " income, in terms of goods and services.

The only way to add a heterogeneous collection of goods and services is by their money values. The usual plan is to " correct " total money values each year, by applying an index-number of prices. This usually means measuring each unit of a good or service by its price in the base year. But different goods may have different relative prices in some year subsequent to the base year because the relative preferences of all consumers have changed in the same direction. Thus, in some subsequent year, all consumers might prefer a smaller " volume " to a larger one, as measured by the index-number of prices. More probably, the preferences of different consumers will have changed in different ways. Thus the apparently objective measure of real income will be in fact based upon consumers' preferences in the base year, given the distribution of income in the base year. Even if we abstract from technical progress and changes external to man (for example, weather-changes) this difficulty remains. To assume constant costs (whatever that may mean) does not remove it.

Further, the State, through its taxation and expenditure, alters the distribution of incomes. It thus alters the relative extent to which scales of preferences of different consumers can exert their influence upon the composition of the real national income. Prices in the base year were in part the result of one distribution; prices in a subsequent year are the result of another. How is a comparison of real incomes between the two years possible ?

Nor is this all. If we avoid the difficulties of defining real income which arise from technical progress, by assuming that technical progress does not occur, there are two[1] obvious ways by which real income per head might be increased. More

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[1] Some would add a third : the size of the population might be altered. To consider this would further complicate the text. Einaudi declares that he borrows the term " optimum " from the phrase " optimum size of population." Yet this concept is by no means unambiguous.

The optimum is usually regarded as that size which under given conditions would work might be done; and accumulation might increase. Clearly some forms of taxation and expenditure would promote these changes more than others.

The "optimum tax" would thus induce persons to work who, without the tax, would not have worked. It would induce workers to work longer hours, or harder,[1] than they would have done without the tax. It would cause more accumulation to take place than would have taken place without the tax. Yet there remains an ambiguity. Over what period are the effects to be considered and on what basis are real incomes of different years to be compared? Einaudi would include only consumers' goods and services in real income. Suppose we could measure real income per head. Are real incomes per head of 4, 4, 4, 4, 4, in each of of five successive years greater or less than real incomes per head of 1, 1, 1, 1, 20? Arithmetically, the latter is greater, but nobody has shown more clearly and conclusively than Einaudi that goods at different times are different goods. What rate of interest shall we apply? Any fixed rate will be an arbitrary choice. The rate which would prevail, apart from taxation, will tend to fall as accumulation proceeds. Any rate, whether fixed or varying, chosen as the rate which prevails in the market or which would prevail in the market under given conditions, introduces the preferences of consumers as between present and future income. The end then becomes "the maximum real income per head compatible with consumers' time-preferences." Our second condition is broken.

Certain other ends, such as "defence," can be brought

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give the greatest returns per head. The difficulty of measuring returns, when there is not one homogeneous product, is the same as that of measuring "real income"; in fact, returns are real income.

Further, there is the difficulty of exactly what conditions are supposed to be "given." Thus, if the relative preferences of the various persons concerned for real income and leisure are taken as given, their division of their time between these two uses is unlikely to remain the same when returns per head change. Suppose their demand for real income in terms of effort is such that when returns per head increase, owing to a change in population, they devote more time to leisure and less to work. Then the optimum size will be greater than it would be if their demand for leisure were completely rigid, so that hours of work always remained the same. Similarly, if their relative preferences for present and future income are taken as given, the amount saved per head will probably vary with returns per head. Again, if knowledge and desires remain unchanged, organisation (for example, combination of factors) will inevitably change when population changes. Thus the notion of an optimum size of population based on the assumption that only population varies, while hours of work, capital, and organisation, remain unchanged, is somewhat arbitrary and unreal.

It may be relevant to add that the optimum size may not be the size which the people themselves prefer. For example, they may all prefer less than the optimum number, in order to have a quieter countryside.

[1] In exceptional cases, shorter hours or less hard; see Robbins, *Economica*, June, 1930.

under "real income." The optimum system of public finance—it can be said—will make whatever provision for defence leads to the maximum real income. The services provided by the State are either instrumental in promoting the flow of real income or are themselves part of real income. Again, leisure can be completely disregarded as an end. Given the hours of work which yield the greatest output, and given the demand of consumers for real income in terms of leisure, the State can manipulate its taxation and expenditure in such a way as to bring about the former. Similarly, given the supply schedule of savings as a function of real income and the rate of interest, the State can manipulate taxation and expenditure in such a way as to get the greatest possible saving. Yet this difficulty of comparison over time remains; and the solution either must be arbitrary or must introduce a second end, namely, conformity to the time-preferences of consumers.

The third condition also cannot be fulfilled. Different systems will have other effects in addition to their effects on real income: for example, they will affect the distribution of incomes in different ways.

We are left with two conclusions. First, the optimum tax-system as defined by Einaudi cannot be discovered by economic analysis. Second, it is not what Einaudi says it is in modern communities: a proportional tax on consumed income. It would promote accumulation more than such a tax. It might involve rebates varying with the amount a person saved, as well as exemption of savings, and it would probably involve State expenditure, out of taxation, upon capital schemes.

V

These conclusions were reached simply by examining the definition of "optimum" given by Einaudi. Yet most of the brilliant analysis in his essay is clearly, in some sense, valid. I am bold enough to suggest an explanation. I suggest that Einaudi does not use his own definition. I suggest that the defects of this definition, and the inconsistency of the various definitions, do not matter. I suggest that the end which Einaudi constantly has in mind is that of "neutrality."[1] I shall therefore develop this concept.

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[1] The evidence for this is the whole of the essay. The most convincing single piece of evidence is a footnote on page 237. Einaudi there replies to Ricci's question whether

There is a paradox in that if no generalisations are true, this generalisation itself must be true. In the same way, if no end conforms to our three conditions, the end of having no ends does conform. It is this which Einaudi calls " neutrality."

A neutral system of taxation and public expenditure is one which translates into effect the voluntary judgments and preferences of the citizens, whatever they may be. All the difficulties of defining ends, of weighting them, of considering other effects, are evaded by the simple process of accepting whatever decisions the citizens themselves make. The assertion that this end is more desirable than any other is, of course, a value-judgment. The assertion that this end is the only end free from the difficulties we have discussed is a statement of fact. There are good reasons for accepting it for purposes of analysis.

The first reason is that a considerable body of opinion does in fact make the value-judgment that this is the most desirable end. It could even be argued that it is implicitly accepted by all who prefer democracy to other systems of government.

The second reason is that it provides a standard from which to measure deviations. Thus a meaning may be given to the term " differentiation."[1]

The third reason is that its acceptance would strengthen the main body of economic science. This usually assumes that law and order are somehow maintained without any explicit mention of a State or of how the costs of maintaining law and order are met. A " neutral " system of public finance involves no greater strain on the imagination than some of the common assumptions of pure economic theory; and it fits harmoniously into its general structure. Of course, the science of public finance would continue to analyse also the effects of deviations from " neutrality."

It is along these lines that great theorists of public finance

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a community of sordid people, continually accumulating, is the ideal. Had Einaudi followed his own definition of optimum, he would have replied that he himself was not making a value-judgment, that he was taking this end, with which he did not necessarily agree, as given, and was trying to discover how it could be attained. In fact, he replies in effect that Ricci has not understood the problem, which is one of neutrality.

[1] The judgment that a given tax-system diverges from neutrality in certain directions is similar to the judgment that a given line diverges from the vertical. It can be based upon votes cast at elections, Press criticisms, and so on, just as one ascertains " the feeling of a meeting."

such as De Viti de Marco[1] and Wicksell[2] have developed their analysis. Einaudi is assuredly in fundamental agreement with them. The end which he assumes is really that of "neutrality."

Doubtless no completely neutral system of public finance exists, or ever has existed, in any community. This is no reason for ignoring the concept. On the contrary, it is a reason for considering what such a system would be like in a modern community. We shall then have a kind of standard. Disturbances arising from the system of public finance will arise, by definition, only because the system deviates from neutrality. If the nature and effects of these deviations can be shown, statesmen and citizens will be able to decide whether they consider these deviations desirable. Some, obviously, will not, for absence of neutrality implies that some are compelled to pay different sums in taxation, or to pay in different ways, or to contribute to State expenditure on different purposes, from those they would voluntarily choose. The others, however, may not realise the full extent and effects of these deviations, or "differentiations," without the help of analysis. It is in this way that the "*ottima imposta*" illuminates reality.

The way to discover what a neutral system would be like is to consider what would happen under very simple assumptions and to modify the assumptions, until they approximate to reality. What follows is the barest sketch, given only to illustrate the procedure. Obviously, it is not a historical account of how States arose. It is, however, a logical explanation, from the economic angle, of why States continue to exist.

Suppose a fairly small number of men in a certain area, without a State. Suppose they have equal incomes and tastes. For what economic reasons might they agree to form a State?

Their reasons would resemble those which lead men to form clubs and similar associations. They would wish to spend part of their incomes upon the collective provision of certain services.

Some of these services would be of such a nature that a private entrepreneur would not provide them at all. Examples are defence against external attack and certain measures, including research, to prevent diseases from arising or from spreading. An army or a fortress guards the whole area. It affords the same protection to each citizen whether he has contributed much or little or nothing towards it. It yields an indivisible benefit. A private entrepreneur would have little incentive to provide such services. The benefit of most services is divisible, in the sense that consumers buy as much or as little as they please and pay accordingly. But an entrepreneur could not well sell services of the kind under discussion; he would have to depend on voluntary subscriptions, and some would give little or nothing in the hope that others would give more.

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[1] *I primi principi dell' economia finanziaria.*

[2] *Finanztheoretische Untersuchungen*, Part II. See also the excellent work by his pupil Lindahl: *Die Gerechtigkeit der Besteuerung.*

In these circumstances every man might agree to form a State and to contribute towards the collective provision of such services, provided his fellows did likewise. Under our present assumptions, all would contribute equally, for incomes and tastes would be equal. All might agree to use part of the contributions in collecting the money and in bringing to book anyone who broke his word. The taxation would be neutral. Each would voluntarily agree to be compelled to pay, provided the others also agreed. The outward semblance of force and sanctions in imposing taxation would clothe a reality of voluntary judgments and preferences. It is idle to point out that each would prefer to pay less in taxation if his fellows made up the difference for him, just as it is idle to point out that each would prefer to pay less than his fellows for his bread.

In addition to services yielding an indivisible benefit, our community might wish the State to provide services which could be sold by entrepreneurs but which the State can provide to greater advantage. Thus all might want certain roads. Entrepreneurs would be prepared to provide them, charging tolls; but the inconvenience of frequent stoppages to pay tolls could be overcome if the State provided " free " roads out of taxation.

Under our assumptions, each person will divide his income between the various collective and private channels open to him in such a way that he would not prefer to spend less in one direction and more in another. The coming of the State will create new services and provide others to greater advantage, but it will introduce no disturbing forces. Each person will prefer the new situation to the old one. And it will be noted that all this involves no interpersonal comparison or addition of utilities, such as is sometimes implied in the concept of "collective wants." Each acts according to his own preferences.

Let us now discard the assumption of equal incomes and equal tastes. Men with equal tastes may be prepared to pay different amounts towards a collective service because their incomes are different. Similarly with men of equal incomes whose tastes, including those arising from their different locations or occupations, are different. For *the amount of collective expenditure which a person desires will vary with the proportion of the total cost which he has to pay*; and in this way a determinate equilibrium can be reached. The method of reaching it is a problem. Wicksell's solution of voting each item of expenditure simultaneously with the tax-source from which it is to be met is unfortunately indeterminate: the total amount voted for collective expenditure would vary with the order in which the several items were voted. Everything must be done simultaneously. Probably a number of programmes could be drawn up, each giving full details of proposed expenditures and contributions, and after discussion one such programme would meet with unanimous agreement.

The postulate of unanimous agreement, implied in the concept of neutrality, can include the phenomenon of groups voting for objects of State expenditure which they do not desire at all. For example, Group 1 wants a given expenditure by the State on objects A and B, but not C; Group 2 on A and C, but not B; Group 3 on B and C, but not A. If the community is divided into these three groups and both A, B and C yield indivisible benefits, all three objects can be taken together. The first group might prefer to pay something towards C in order to get the contributions of the other groups towards A and B, and so on; each person might prefer the situation which resulted to an absence of State expenditure on all three objects.

The postulate of unanimous agreement appears to break down if some persons declare themselves unwilling to contribute anything towards collective services. It is no solution to exempt them from all taxation. They could not be prevented from sharing the indivisible benefits; and others would be tempted to feign a like unwillingness. De Viti de Marco[1] declares that they must be regarded as pathological cases against whom the State should defend itself. Certainly they are inconsistent. They apparently desire to live: the poet's statement:

> "And if you would not this poor life fulfill,
> Lo! it is yours to take it when you will."

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[1] *Op. cit.*, p. 67 in the German translation.

remains true. Yet they refuse to contribute towards services which assist them to obtain and enjoy the means to life, services which would not exist without the State. They are a problem. The problem can be evaded by assuming that all men act consistently; or it can be handed to the social philosopher for his discussion; or it can be dismissed by pointing to the relatively negligible numbers of such persons.

Our hypothetical community might agree to make collective gifts, in money or in kind, to poor persons suffering from sickness or unemployment or old age: there is nothing in our assumptions to exclude a "social conscience." Those who wished to supplement the State's activities in these directions could do so privately or through private societies. If the income of the community were sufficient, all might agree, in their own interests, to exempt from taxation minimum personal incomes required for "necessaries for efficiency." The State might undertake, as Wicksell[1] has shown, the provision of certain indivisible objects, such as bridges or roads, which would not have paid a private entrepreneur. On the assumption of equal incomes and tastes, and neutrality, this could not happen. If each tax-payer is prepared to contribute an equal sum, such that the total covers the costs of the service, it would have paid a private entrepreneur to provide the service and to collect payment through tolls, or better, season tickets. But if incomes or tastes are unequal, this may happen: the point being that the State can charge different prices to different people while the entrepreneur cannot discriminate so completely, if indeed he can discriminate at all.

Taxes might be paid in money, leaving tax-payers free to spend the rest of their incomes as they chose. But if the cost of collection from relatively poor persons was high, or if people preferred to pay part of their taxation "wrapped up in prices" of consumers' goods, such goods might be taxed. If only some were taxed, tax-payers might prefer to select those for which the demand was fairly rigid for taxation. If all were taxed, the same percentage tax on all would be equivalent to proportional taxation of consumed incomes. In any event, the whole tax-expenditure system under our assumptions would have the agreement and approval of all the citizens.

When we discard our last assumption, namely that numbers are fairly small, we are faced with the difficulty of ensuring that the various preferences of citizens are correctly mirrored by their representatives in Parliament. Wicksell[1] suggested a scheme of proportional representation; but the economist must leave these questions to the political scientist. The economist, however, can observe modern democratic states; and he may conclude, with De Viti de Marco, that they are not so very far from "neutrality." Periodical elections, constant criticism from the Press and organised groups, the habit of making concessions to minorities, usually ensure that no substantial body of opinion is for long in sharp disagreement with the whole system of public finance which prevails. This is not the place to give evidence for this belief. Whether it is true or not is irrelevant to the argument. These observations are meant only as a bare sketch of what a neutral system might be like. All that we need for the argument is the concept of neutrality. The sketch has been given to illustrate and explain this concept. And it is this concept which, in my view, Einaudi has in mind.

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[1] *Op. cit.*, Part II, Ch. V. Compare Marshall: *Principles*, Book V, Ch. XIV, p. 490.

VI

The chief conclusion of the "*ottima imposta*" is that a tax on gained income differentiates against saving whereas a tax on consumed income does not. I believe this conclusion is false. A tax on gained income may or may not differentiate against saving; we cannot say without more data whether it does or does not.

The word "differentiation" implies some standard. Suppose we know that a surgeon charges A £10 and B £20 for an exactly similar operation. He is clearly differentiating in favour of A relatively to B, and against B relatively to A; but can we say more? We can say more only if we have some standard. If his usual fee for that operation is £10 we can say that he is differentiating against B. If it is £20 we can say that he is differentiating in favour of A. If it is £15 we can say that he is differentiating both in favour of A and against B.

In the same way, it is clear that a tax only on certain goods will cause less of these goods and more of others to be bought than if the same amount were raised by an equal percentage tax on all goods. Special taxation of certain kinds of property will cause less new investment to flow into those channels and more into others than if the same amount were raised by the taxation of all property. Some turnover taxes may cause more integration, and some progressive taxes less investment in risky enterprises, than if the same sums were raised in different ways. All this is clear on the assumption that in any event the State obtains the same sum and spends it in the same way. Under this assumption, Einaudi's illuminating comparisons between the situation resulting from a tax on gained income and that resulting from a tax on consumed income establish one point beyond dispute. The former tax offers a smaller net return on savings than the latter, and therefore if the supply-schedule of saving slopes upwards over the relevant range, less will be saved than under the latter tax.

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[1] *Op. cit.*, Part II, Ch. IV.

But this alone does not enable us to declare that the former tax differentiates against saving. We need some outside standard. I have urged that the most suitable standard is neutrality, and that this is really the standard which Einaudi has in mind. The whole of his analysis, in so far as it compares the effects of different kinds of taxes, is beyond reproach. But when he draws his conclusion about differentiation he does not judge solely by the standard of neutrality. He seems influenced in part by the conclusion which follows from his definition of optimum: namely, that one tax-system is better than another if it promotes accumulation more. Thus he finds his standard neither in his pure "neutrality" concept nor in his pure "optimum" concept. He finds it in the state of affairs which would exist in the absence of taxation.

Suppose, he argues, that before there is any taxation the rate of interest is, say, 5 per cent. A tax on consumed income will leave the rate of interest unaffected at 5 per cent. But the impact-effect of a tax on gained income will be to lower the rate of interest and (assuming an upward-sloping supply curve of savings) this will introduce a disturbing force into the existing economic equilibrium leading to a new equilibrium in which the market rate of interest is higher, the net return to savers is lower, and the volume of saving is reduced. The tax on gained income differentiates against saving; the tax on consumed income does not.

But is this line of reasoning valid? I suggest that it is not valid, *because it overlooks the effect of State expenditure on the net income which real capital yields to its owners*.[1]

Take a simple example. Suppose that, in the absence of taxation, Tizio has property worth 4,500 which yields him an income of 225. He pays, say, 22·5 of this each year to an entrepreneur who has an armed body of employees. In return the entrepreneur does his best to protect the property against theft and damage. It would seem reasonable to deduct the 22·5, just as expenditure for renewals, replacements and repairs has already been deducted, and to say that the property yields a net income of 202·5. Now suppose a State is formed and Tizio pays 22·5 a year to the State instead of to the entrepreneur, in return for the same services. The position does not seem changed nor the equilibrium disturbed.

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[1] Compare the well-known doctrine that a tax on buildings which is spent in ways which raise the value of the buildings by the amount of the tax need not cause less free capital to flow into buildings, relatively to other channels.

Einaudi would doubtless reply that this is not the whole story. Suppose Tizio's 450 was saved in Year 1 from an income of 10,000, taxed at 10 per cent. Tizio has already paid 500 tax on the 5,000 he intended for saving and this 500 is more than the capitalised value of the services rendered by the State in connection with the property, since these services are worth 22·5 a year.

Let us accept this. The payment of 500 in Year 1 covers the State's services in connection with the property. The property yields 225 a year. Now suppose Tizio also earns 225 a year. Einaudi would agree that this should be taxed. And why? In return for the services rendered by the State in providing Tizio with security in which to live and to consume his 225, and possible partly in return for various amenities provided by the State which increased Tizio's real income. But all this is just as true of the other 225, yielded by the property and consumed by Tizio each year. Therefore each 225 should be taxed at the same rate.

The point is that net income from property is greater than it would be in the absence of the State. On the one hand, this means that savers will be prepared to pay additional taxation equivalent to the increase in the net yield of their property due to the services of the State. On the other hand, it means that an income from property involves the State in more expense than a similar income from work. In both cases the State must protect the persons concerned, but in the former it must protect the property as well. If there is an exact equivalence between the increase in the net yield of the property and the additional taxation paid, the curve S′S′ in our diagram ceases to exist. There is no impact-effect ; there are no repercussions. Actually, the coming of the State will probably enable the services rendered in protecting property to be rendered more cheaply. If the additional taxation of property-incomes (over and above work-incomes) is equal to the cost of these services, the net return to savers will be raised, the amount saved (assuming an upward-sloping curve) will increase, the market rate of interest will fall, and the time-structure of production will be lengthened.

Einaudi might urge that under the system of taxing consumed incomes the capital sum invested will be taxed when it is withdrawn and spent. But if it is not withdrawn it will not be taxed, although the State incurs expenses in protecting it and thereby increasing its net yield to its owner. And even if it is withdrawn, the payment will be made after the State has incurred these expenses, year by year, and thus may be less than the equivalent, at the time of payment, of the expenses incurred.

In this discussion I have been tacitly supposing that all savings are used for productive purposes and that savers either own the resulting property themselves or get an equivalent return by lending to others (for example, that the yield on fixed-interest debentures equals the average yield on ordinary shares). Thus I have assumed that the demand for savings depends only on the productivity of capital.

In fact, part of the demand comes from persons wanting consumption loans. Suppose the lender is taxed on his income from such loans just as heavily as on income from tangible property. Then clearly the market rate of interest on both kinds of loans will be identical: it can be regarded as governed, on the demand side, by the marginal productivity of real capital. Before the State appeared, the market rate of interest on real capital must have been higher than the rate obtainable from a " consumption " borrower whose credit was perfect. For the payment to the entrepreneur for protection had to be deducted from the former and not from the latter. Now the two rates are identical. They are lower than the pre-State market rate on productive capital (owing to increased saving) but they must be higher than the pre-State market rate on consumption loans.[1] Hence the creditor receives more, owing, indirectly, to the action of the State in raising the *net* yield of real capital. It seems reasonable that the State should take part or all of the increase in his receipts.

Thus Einaudi's conclusion does not necessarily follow even from the concept of neutral taxation. Nevertheless the " *ottima imposta* " remains one of the most stimulating theoretical essays of recent years.

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[1] Because the demand-curve for savings is not completely inelastic, i.e. not a vertical straight line.

Recent Land Tenure Changes in Mid-Devon

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The following is an account of some of the results of a survey of the changes which have taken place in the conditions of land tenure in a part of Devonshire in the past quarter century. The examination was designed primarily to cover the last twenty years including the period of the war and the period of depression—or depressions—since 1920.

The selected area lies between the valleys of the Teign and the Exe rivers and comprises twenty parishes stretching from Kingsteignton and Bishopsteignton near Newton Abbot in the south, to Holcombe Burnell and Whitestone, beyond Exeter, in the north. The soils of the area range from the heavy culm measures to the well-known light red type. There is variety in the topography—steep lands especially in the Teign Valley and Whitestone, and flat lands and some marshes in the east. The farming might be described by the occupiers as " mixed " but there are actually representatives of many types: some with emphasis on rearing-cattle; others with milk selling as the main business; some carry on a sheep and corn enterprise on the lighter land, and others fatten, especially on the Exe marshes. Livestock and produce markets at Exeter and Newton Abbot serve the whole area.

All of the farmers with over 20 acres in this district —and three who happened to have just under 20 acres— were visited in the course of the investigation and the essential information was obtained from 216, which represented over 90 per cent. of the total.

The following table shows the number of farms of various sizes and the nature of the occupation, namely, whether the farmer was owner or tenant of his holding.

TABLE 1

Size and Nature of Occupation of Mid-Devon Farms

SIZE-GROUPS

	acres						
	20–50	50–100	100–150	150–200	200–300	over 300	Total
All farms ...	40	52	34	39	41	10	216
Owners ...	16	16	13	21	9	4	79
Tenants ...	24	36	21	18	32	6	137

The survey contains a rather higher proportion of medium-sized farms than is common throughout the county or throughout the country. There are no very large farms in the area. Only ten were over 300 acres. The more important feature of the table, however, is the nature of the occupation. The proportion of ownership to all farms is 37 per cent. which is almost identical with the latest estimate for the whole country. Of the farms over 200 acres, there was a much smaller than the average proportion of owners, only 26 per cent. It is more difficult for farmers to establish themselves as owners on fairly large farms because of the extra capital required.

Origin of Farming Community

A question raised in the course of the survey was the origin of the farming community, what were the antecedents of those who were entrusted with the industry in the area. The information obtained tended to confirm two general opinions which are held regarding farming, first that farming is largely recruited from the families of farmers and, second, that the remainder are men of small savings who came into farming from other, mainly wage-earning, occupations. In this district there is little trace of the capitalist making an investment of agriculture.

Age of Farmers managing Farms of Various Sizes

Some interesting information was obtained on the age of the men who are in charge of the farms. By classifying the farms according to size we get some idea of the more mature age of those who occupy the larger farms. The age of two farmers was not obtained.

TABLE 2

Age of Farmers managing Farms of Various Sizes

	acres													
Age of frmrs.	20–50		50–100		100–150		150–200		200–300		over 300		all farms	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Under 40	13	32·5	22	43·0	12	35·2	7	18·0	7	17·5	1	10·0	62	29·0
Over 40	27	67·5	29	57·0	22	64·8	32	82·0	33	82·5	9	90·0	152	71·0

The table does not show the " agricultural ladder " which might be expected. Actually there is a larger proportion of younger men on farms between 50 and 150 acres than on farms of 50 acres or under. This, however, does not imply the non-existence of the ladder. Further examination of the data about previous occupations, but not as shown here, indicates that the ladder has been climbed up or down by farmers who are now on holdings of less than 50 acres. A larger proportion, indeed, of the men on these holdings who have held other farms previously have used the ladder than in the next two size-groups. It has been suggested that the proportion of older men in the small farms is due to a method of " retirement " adopted by older farmers, which consists in giving up a large farm and taking a smaller one. There is evidence of this in the area as eight of the farmers with under 50 acres were " retired " farmers. In all other size-groups the table shows a steady progression of size with age, illustrating quite clearly that it is mainly the older men who are in charge of the larger farms—only about 17 per cent. of those on farms over 150 acres are under 40 years of age. Of the farmers who previously held other farms and are now holding more than 150 acres it is notable that nearly all have climbed the ladder to attain this status. The average age of starting for all farmers was 29·5 years, and the average age at Michaelmas, 1932, was 47·7 years.

At any rate there is a clear suggestion of two sets of conditions, (1) in the under-150-acre group and (2) in the over-150-acre group. This is shown in the table which relates size of farm to a different age grouping.

TABLE 3.

Age of Farmers managing Farms under and over 150 acres.

	Under 150 acres		Over 150 acres		All farms	
Age of Farmers	No.	per cent.	No.	per cent.	No.	per cent.
Under 40 ...	47	37·5	15	16·9	62	29·0
40–50	24	19·2	31	34·8	55	25·7
Over 50	54	43·3	43	48·3	97	45·3
	125	100·0	89	100·0	214	100·0

As one would expect, there is a smaller proportion of older men managing the smaller farms.

Actually there are two agricultural ladders which tend to obscure the age effect of each other. Thus there is a ladder *to* farming or *into* farming: a man may start anywhere on the ladder, depending on his inheritance or capital resources, which cannot always be correlated with age. Secondly, there is the ladder *in* farming after the career has been started.

Present Age and Nature of Occupation

This question of age can be taken a stage further by relating it to the nature of the occupation, whether owner or tenant. The table which follows indicates the size of farms and the percentage of owners in the different size-groups.

TABLE 4

Percentage of Owners arranged according to Age of Farmers and Size of Farms

	Size-Groups (acres)						
Age	20–50	50–100	100–150	150–200	200–300	over 300	All farms
All farmers	40	31	38	54	22	40	37
Under 40 ...	31	14	17	29	—	—	18
40 and over	44	45	50	59	27	45	45

Taking all the farmers interviewed—with the exclusion of two who were tenants and whose age was not obtained—18 per cent. of those under 40 years of age were owners of their farms, whereas 45 per cent. of those over 40 years of age were owners. Sixty per cent. of the tenant farmers on holdings less than 150 acres were less than 45 years old. This proportion was reversed on farms over 150 acres, for only 40 per cent. of those were less than 45 years old. Table 4 indicates that on all size-groups ownership was more usual where the occupier was over 40 than under 40 years of age. This tendency was especially marked on the larger-sized farms. That farms over 200 acres show a less proportion of ownership than in the preceding size-groups is also not without significance. These facts, in so far as with so small a sample they can be taken as representative, merely emphasise the point made earlier that the factor of capital makes it difficult to operate the larger farms as owners, and naturally the younger men are more severely handicapped in this respect.

There is, however, one difficulty about the significance of these figures as showing progressive movement towards ownership as men grow older. The break-up of estates and the resultant increase in farm ownership from about 12 per cent. for the whole country before the war to about 37 per cent. in 1927 has set up new conditions to which agriculture cannot yet be said to have adapted itself. The same is true, as will be seen later, in this area. To put it another way, if about one-third of all farms had been for, say, twenty-five or fifty years the normal proportion of " owned " farms, then we might have expected some normal relationship between age of farmers and ownership to have worked itself out. But the revolution in tenure is so recent and perhaps still in process that the indirect effects must still be incomplete.

This is important to bear in mind, but to leave the interpretation like this is begging the real question, so a further analysis is necessary to show how many of the older men made the change and whether it was easier for them to do so.

The lateness at which ownership begins is evident from the average age of starting as owners both of those who start as owners and those who have become owners by changing their status. Twenty-nine farmers, including three who are now tenants, began their career as owner-occupiers. Their average age at starting was 32·6 years. Of the 55 tenants who had changed their status within the twenty-year period, ownership began at the average age of 43·8 years.

Changes in Management of Farms

The survey of this Devon area gives evidence also of the amount of continuity and changing in the management of the farms. Taking all farms into consideration when allowance is made for such things as (*a*) the permanent factors of the individualism of farm organisation and the fact that progress or failure both involve changes of farm, and (*b*) the temporary factors peculiar to this twenty-year period: the upheaval of the war, the slump of 1921 and the two deepening depressions since then, the paucity of change indicated by the data is remarkable. Forty farms, about 20 per cent. of the total (i.e. total of the farms where the twenty-year history is known) did not change hands at all; 107 farms, 53 per cent. of the total, changed hands only once. Five per cent. changed hands three times. One farm changed hands four times in the two decades.

Every kind of change is included in the foregoing figures, but it includes also a record of the change within the family. These changes usually took place at the death or retirement of the father and represent the effect of inheritance on the changing of farms. On 45 of the farms, about 22 per cent. of the total or 28 per cent. of the 163 farms showing change, this type of change was found to have occurred in the twenty years. It can be fairly claimed that this type of inheritance reduces still further the degree of change as it occurs within the family without the inclusion of a " third party."

Twelve of the farmers in the area who were farming their present holding before 1912 acquired it from within the family. Forty-six families (23 per cent. of the total) have been in their present farms since the last century. Most of these farms were of the largest size classes—34 being over 100 acres, and of these 20 were over 200 acres. The majority of the occupiers were tenants in the ratio 29 : 17, which is about the same as for the district as a whole. The indications are that slightly more changes occur among the tenants than among the owners. Although more of the tenant farms had been passed on from relative to relative the proportion of farms which have been in the hands of the same family since before 1900 is very similar.

It is of interest to consider 57 of the owner-occupied farms which were not in continuous owner-occupation since 1912, and to observe the respective average number of years of tenancy and ownership in the twenty-year period from 1912 to 1932, as in the following table:

TABLE 5

Average Number of Years of Tenancy and Ownership on Farms changing to Owner-occupation 1912–32

	SIZE-GROUPS						
	20–50	50–100	100–150	150–200	200–300	ov. 300	All fms.
Years Tenant	8·38	9·46	10·00	7·56	9·75	11·00	8·99
Years Owner	11·62	10·54	10·00	12·44	10·25	9·00	11·01
No. of farms	8	12	10	16	8	3	57

On farms of under 300 acres it is noticeable that the farms have been at least half of this full period as owned farms. The exception—over 300 acres—only contains 3 farms. The average length of owner-occupation on these 57 farms was 11 years. Actually, a big proportion of the new ownership associated with the twenty-year period dates from 1919 to 1921. An analysis of the number of changes on 53 out of these 57 farms is also of interest. The number of changes on 4 were unknown. Given in percentages, 26·5 showed no change; 51 per cent. showed only one change; 20·7 per cent. showed two changes and 1·9 per cent. showed three changes. Altogether there were 52 changes of occupier on these 53 farms, and of these changes 23 occurred when the farm passed from a tenant to an owner-occupier. Within the period of owner-occupation there were only 7 changes of occupier, which is a further proof of the greater stability, or stagnation, associated with owner-occupation. Correspondingly, 22 changes occurred within the tenancy period.

Change from Tenancy to Ownership

Perhaps the most outstanding feature of land tenure in this twenty-year period has been the amount of changing by tenants to the status of owner-occupiers. Very frequently the sitting tenant was in the position where he had to buy or clear out of his farm. There were 30 farmers in this area who had an experience of this kind and decided in favour of purchase, and at the same time there were 23 men now owning farms which were previously held by tenants. Thus 53, almost exactly 25 per cent. of all the farmers in the district, had become owner-occupiers where previously they, or their predecessors, had been tenants.

Unfortunately the size of the sample is rather small to indicate adequately whether any particular size-group has felt the changes more than others, although, as it stands, it appears that as the farms increased in size there was a greater tendency for the sitting tenants to buy their farms when the occasion arose. For instance, the proportion of farms over 200 acres which was bought in this manner was distinctly greater than that below 200 acres. No farms under 50 acres were so purchased. The following figures indicate this position:

TABLE 6

(*a*) *Number of Sitting Tenants who bought their Farms*
(*b*) *Number of Owner Occupiers who succeeded Tenants*

	Size-Groups						
(*a*)	20–50	50–100	100–150	150–200	200–300	ov. 300	All frms.
Number ...	0	7	5	9	7	2	30
Per cent. of total owners in size-group	0	44	39	43	78	50	38
(*b*)							
Number ...	9	4	4	4	1	1	23
Per cent. of total owners in size-group	56	24	31	19	11	25	29

Where the previous occupiers were tenants the biggest proportion appears to have been on the smaller size-groups under 150 acres. This rather bears out the impression gained in the first part of the table, where the men in the larger-sized farms were inclined to purchase their farms. It is not definitely known on some of the farms whether the fact that the farm was up for sale was the main reason why the previous occupier left. Certainly it is the most definite reason for the group between 50 and 100 acres in size, and again between 150 and 300 acres. The reason why several of the previous tenants left was unknown, and one had died. In the size-group 100-150 acres one of the holdings was previously run as a home farm. Curiously enough, 10 of the owned farms of 50 acres or under were previously in the hands of owners.

The information shows further the years in which the change over from tenancy to ownership took place. Considering the date at which ownership commences for the above 53 farms, the fact is clearly established that this change was wrought chiefly in the decade from 1916 to 1926, and especially in the four years 1919 to 1922. In common with the rest of the country, many of the landlords at that time sold their farms. This left the alternative to the sitting tenant of either buying or clearing out. From the above sample it appears that a slightly larger proportion of the tenants decided in favour of buying.

Length of Occupation of Present Farms

Looking at this question of movement from another angle the survey gives information regarding the farming career of the farmers now in occupation of these farms. The average length of time, at Michaelmas 1932, during which these 216 farmers had occupied their present farms was 12·9 years—not a very significant figure except in so far as it indicates that shifting and changing of farms is not frequent.

TABLE 7

Length of Occupation by Farmers of their Present Farms

	years													
	0–5		5–10		10–15		15–20		20–30		30–40		Ov. 40	
	T	O	T	O	T	O	T	O	T	O	T	O	T	O
No. of farmers	48	7	27	20	27	23	23	11	5	12	6	5	1	1
Per cent. of total ...	25·5		21·8		23·1		15·7		7·9		5·1		0·9	

Only 13·9 per cent. of the farmers had been in occupation for over 20 years, 6 per cent. for over 30 years, and less than 1 per cent. for over 40 years.

Some significant points are suggested when farms are classified by size. First of all, as regards all farms irrespective of owners or tenants, the length of occupation (present farmers) of the smaller farms is shorter than of the larger farms. There is obviously less inducement to shift where the farm is large enough to absorb the farmer's activities. On the other hand, if one were to assume that a man only achieves the larger farm late in life one would expect the period of occupation to be shortened for that reason. There was quite a proportion of each size of farm held in long occupation. In this connection it is important to note that some farmers were on their present holding before 1912, are still there, and are likely to remain for varying terms of years.

Passing then to the distinction between owners and tenants the data bear out the reasonable expectation that there is greater freedom of movement among tenants than among owners and that this freedom was exercised, since in all sizes of farm, with one exception, the length of occupation is greater among owners than among tenants. Thus taking all sizes, the length of occupation up to 1932 is 15·7 years for those who are now owners and only 11·3 years for the tenants. The exception is amongst the smallest farms where the owners averaged only about 9·5 years in occupation while the tenants averaged 12·7. Here the figures were influenced by these "retired" farmers already mentioned.

Number of Farms held by Farmers in their Career

Going still deeper into the figures it is possible to find out more about the previous experience of the present occupiers. If the farms are divided into 5 groups according to the number of farms each has occupied in the course of his career as a farmer on his own, it is found that over half of the farmers were in occupation of their first farm. Only 4 out of 216 had farmed more than 3 farms in their farming career. Note, of course, that this is not in itself evidence of continuity, since previous analysis has shown that there are many comparatively young men farming in the area. The interest in the grouping of farmers by the number of farms occupied is mainly, however, in the change from tenant to owner and the element of stability, or stagnation, thereby imposed.

Out of these 216 farmers, 156 retained the same status of tenure throughout: 26 as owners and 130 as tenants. The remaining 60 (28 per cent.) changed from one form of tenure to another during their farming career within the last 20 years. Two farmers, not included in the latter figure, started as tenants before 1912, but also changed to owner-occupiers on their present farms before that year. The principal change was from tenant to owner. Only 7 farmers took the step in the reverse direction by becoming tenants after owning their own place.

Thus 53 farmers had changed their status of tenant-farmer to that of owner-farmer, a natural outcome of the circumstances of the past 20 years when estates were being broken up. But it is notable that so few, having chosen or accepted the inevitable responsibilities of ownership, should have decided or have found the opportunity later to divest themselves of these responsibilities. A further classification shows that 30 of these farmers became owners by purchasing the farm they were occupying, while the remaining 23 became owners through changing their farm.

Movement from one Size of Farm to Another

An attempt has been made to record the movement from one size of farm to another of the farmers interviewed in this survey. As has already been pointed out, the degree of immobility is remarkable in view of the agricultural history of the past 20 years. Over half of the farmers in the survey were farming their first farm and these are therefore ruled out for the present purpose, leaving 91 farmers who had made one or more shifts. Of the 59 farmers who had made one shift it appears that 41 had moved to larger farms. When we turn to those 27 farmers who were on their third farm and had therefore made two shifts, the situation is more complicated. They have therefore been separated into first and second shift. In the first shift 15 farmers moved to larger farms and 11 moved to smaller farms (as the size of one farmer's first farm was unknown his direction of shift was also unknown). In the second shift 15 moved to larger farms and 12 to smaller farms. These figures do not quite tell the whole story, as some farmers in their first move went to larger farms and in their second to farms smaller than the second but larger than the first or smaller than both the second and first and so on. There are half a dozen different shifts of this kind, but the story is partially completed by stating that 16 farmers were still managing farms larger than when they started. Only 4 had been on more than three holdings throughout their farming career.

Influence of Ownership on Movement

The movement, however, may be upset by the factor of ownership. A steady progress from one farm to a larger farm implies normally an increase in capital making possible the occupation of the larger acreage—assuming a similar type of farming. But if there is interposed the necessity, or choice, of sinking capital in the farm itself the individual may either be debarred from moving to a larger farm through lack of capital or he may even have to move to a smaller farm. Looking through the records of this survey there is a little evidence of this, but hardly enough to establish the case.

Evidence on movement is scanty, since first it deals with only a comparatively small area and even within that area it does not lead unanimously in one single direction, but it is clear that the results do not conflict with, and indeed, conform to expectations in certain features. One would expect that the change from the status of tenant to that of owner, by reason of the extra capital required would restrict the opportunities of movement to larger farms.

The foregoing discussion of size leaves out of account the rent or the quality of the land, and not every movement to a smaller farm means a decline, since size of farm is not necessarily equivalent to size of business, or to profit-earning capacity. Indeed, some individuals in moving to smaller farms may be putting themselves or their capital into higher profit-earning conditions—often with a different type of farming.

Reasons why Farmers move from their Farms

An attempt was made in the survey to obtain by direct methods some idea of the reasons why farmers move. The results, however, of this attempt were far less satisfactory than the facts themselves. Complex combinations of psychological and other factors are inherent in many reasons of movement, and are incapable of simple explanation although the farmer may give emphasis to one aspect. There were in all 126 changes made by the 90 farmers who had changed their farms during the course of their career, which in a few extended to 1900 or earlier, and 126 had not changed at all. No reasons were obtainable for 6 of the changes. All of the others were given in somewhat different forms, but it is possible to classify them into 18 main categories. These are tabulated as follows:

TABLE 8

Reasons given by Farmers for changes of Farm during their Farming Career

I. DOMESTIC REASONS OR ILL-HEALTH		14
II. PROGRESSIVE BUSINESS MOVES		37
Desire for bigger farm ...	15	
Wanted better farm or district	10	
Landlord offered farm on same estate	2	
Good chance to sell ...	2	
Bought another farm ...	6	
Wanted to go on own ...	2	
III. DIFFICULTIES WITH OWNERS		55
Farm sold	22	
Owner wanted to farm ...	5	
Term was up	3	
Rent trouble, interference, alterations, etc. ...	20	
Difficulties about repairs ...	2	
Nuisances, blasting, flood	2	
Game	1	
IV. FARMING DIFFICULTIES		14
Hard-working land	7	
Rapid fall in prices	2	
Promises of politician for family of growing boys ...	1	
Cattle losses ...	1	
Lonely, inconvenient	2	
Too big, unable to afford labour ...	1	

Total reasons given, 120; unknown, 6.

The table shows a very miscellaneous collection of reasons, but they can be classified more clearly into four categories. (I) Domestic reasons not associated with the business, (II) progressive business move, (III) difficulties with owners, and (IV) farming difficulties. These categories are not quite clear-cut or always strictly determinable. What are grouped as progressive business moves are not all of the same order: for the most part it means a movement to a larger farm, but in others it indicates the purchase of a farm. Difficulties with owners embrace both grievances and the desire of the owners to sell or to farm themselves. The term "farming difficulties" does not necessarily mean financial failure, but includes those reasons which indicate difficulties in managing the farm. Reference to the table indicates what is included in each group.

The situation as outlined by the table is of more than passing interest, although naturally some of the reasons given may not tell the whole story. The most notable fact is that family difficulties play so small a part as only about one ninth of the shifts were attributed to difficulties of this kind. Some of the difficulties with landlords may disguise farming difficulties as well. A substantial proportion, about a third of the changes, were made with progressive intent. The farmers thought they were making a sound move. On the other hand, nearly half of the shifts were attributed to difficulties with owners. In the experience of 22 tenants, the farm which was held was sold; with 5 the owner wanted to farm and in 3 the lease was up, although that in itself need not have been a reason for shifting. These are all questions of security of tenure, and since the Agricultural Holdings Act of 1923, at any rate, it is surprising to find that some of the changes have been attributed to insecurity of tenure. Seven of the foregoing changes have occurred since 1924. Twenty-five farmers gave the reasons for their shift as grievances with the owner. The biggest item here, however, is one which includes rent trouble, interference, and alterations, and of these the " differences " over rent were the chief. Six out of the eight grievances since 1924 were on account of the rent being considered too high by the tenant. The main factor may have been, as was stated by several farmers, the alterations of the layout of the farm and the removal of fields for building purposes. These are put down as grievances, as of course to the farmer they are, but they might more properly be put under insecurity of tenure and help to swell that already large item. Other grievances were comparatively small, only two being disagreements as to repairs, two to nuisances, and one to game.

Reasons why Previous Occupier left

Alongside of these reasons given by the present farmers as to why they left their previous farm may be set the information sought from present occupiers as to why the previous occupant of their farm came to leave. Obviously it was not possible to obtain complete information and as what was obtained was second-hand, some of the reasons may not have been the main reason. Many, however, are clear and straightforward, and introduce causes of movement such as death and retirement which obviously could not have operated in the previous classification of reasons for moving. The reasons are classified in the following table.

TABLE 9

Reasons why Previous Occupiers left

Death			34	Progressive Move		18
Retirement			40	Took another farm	2	
Death or retirement			14	Larger or better farm	11	
Private, domestic, ill-health			20	Other business	1	
Difficulties with owner			43	Bought another farm	4	
Insecurity	Farm sold	19		Difficulties		27
	Got notice	7		Couldn't make farm pay	21	
	Paid to leave	2		Bankruptcy	4	
Grievances	Repairs and rent	9		Lack of capital	2	
	Interferences and difficulties with landlord	6		Originally Home Farms		2
				Unknown		18

Total: 216

This larger sample of reasons for moving introduced new factors (and incidentally shows the danger of reasoning too much from the reasons why present farmers have shifted from previous farms). Out of 198, for 18 are unknown, 34 of the previous occupants had died and 40 had retired entirely from active farming. Fourteen of the previous occupiers were relatives of the present farmers, but it is not known whether they died or retired. Domestic and private reasons account for a somewhat smaller proportion than before. The insecurity of tenure factors also bulk largely. Fourteen out of 43 experiences of difficulties with owners have happened since 1924. Quitting the farm through farming difficulties is almost the same proportion as before. A much smaller proportion than in the previous classification have been given the credit of shifting for progressive reasons. Perhaps the most interesting feature of this table is the number who have retired. "Farmers seldom, if ever, retire," it is said, but here it has been reported that at least 20 per cent. of the vacancies of farms were created by the retirement of the previous occupant. (Undoubtedly the proportion is even greater, for allowance has to be made for relatives who have either died or retired from farming.) Since it is probable that the greater proportion of those have died, the total numbers claimed by death is also very considerable.

Mr. Harrod and the Expansion of Credit

In the second part of his article in Economica, August 1934, Mr. Harrod seems to me to have laid aside the distinctions so well established in the first part, and to have succumbed to the charms of the Grand Monetary Tautology, which, long found useful by bankers as a cloak for their misdeeds, is now being rediscovered with alarming frequency by theoretical economists. The bank's balance-sheet always balances : *alias* Savings always equal Investment : *alias* all money which is anywhere must be somewhere. Mr. Harrod makes use of this principle to argue that, if real income is increasing, equilibrium is consistent with a policy of expanding bank money at the same rate, so as to maintain stability of the price level. But surely his argument proves too much. The principle can be used equally well to justify the expansion of bank money at any rate whatever, since the newly-created money will always be " saved " by someone, i.e. will find its way into *somebody's* deposit account. The bank " has only lent what has been deposited with it ": not only is there an asset to be set against every liability, but, what is even more gratifying and disarming, there is a liability to be set against every asset!

I do not feel certain enough about the meaning of some of Mr. Harrod's terms to be able to state confidently by what paths of thought he has escaped, as I feel sure he *has* escaped, from dealing with the real point at issue. But it would almost seem that his additional so-called " producers' credits " must be issued on the express condition that they are used for no other purpose than to scale up the money incomes of all existing factors of production in a given proportion. If this is so, there will be no maladjustment. But neither will there be any growth of real capital. And there seems no reason whatever to suppose that in an individualist economy the issue of additional loans to producers will, in fact, be made on these highly peculiar conditions. We must surely assume it to be made in the ordinary way, and to eventuate in the formation of new material fixed or working capital.

In order, therefore, to discover what banking action will maintain equilibrium in the circumstances supposed, we must inquire *why* real income is increasing. It will suffice to distinguish broadly three cases :

i. Real income is increasing as a result of technical improvement, the quantities of all the factors of production remaining unchanged. There is prima facie nothing in such an increase to cause any member of the community to desire to increase the proportion of real income over which he holds command in monetary form. If money is held constant, the real value of balances will increase in proportion to the increase in real income, but automatically, and without abstinence on the part of anybody. To increase money by way of producers' credits in such circumstances will rupture equilibrium, since it will be an attempt to utilise a non-existent act of abstinence.

ii. Real income is increasing as a result of the growth of population. The vital difference between this and the preceding case is that each new worker and entrepreneur will desire at some time to build up a balance on the customary scale, thus increasing over a period the proportion of real income over which he holds command in monetary form, and performing acts of abstinence which will be available for utilisation by the bank in the form of producers' credits.[1] I have attempted elsewhere to initiate discussion as to the kinds of ways in which the maintenance of equilibrium under these conditions depends on the rate of growth of population, on the speed with which balances are built up, and on the preferences of the bank with regard to the character of its assets. But little progress has been made with the subject; and its importance in view of recent changes in the rate of population-growth makes it much to be desired that economists of mathematical ability should give it more attention.

iii. Real income is increasing as a result of capital growing more rapidly than population, e.g. capital growing while population remains constant. Here, so far as English writers are concerned, discussion of the criterion of equilibrium is in an even more embryonic stage, and seems to be almost confined to a few isolated and conflicting pronouncements. Thus Mr. Hawtrey states that equilibrium requires that the growth of aggregate money income should keep pace with the growth of population *and of capital*; and Professor Pigou's "standard" monetary system involves altering aggregate money income by the difference made to the number of workpeople *or other factors of production* at work, multiplied by their pre-existing rates of pay. Mr. Meade, on the other hand, asserts that, population being constant, equilibrium requires constancy of aggregate money income; while Dr. Hicks appears to incline tentatively to the same view.[2] A debate between these four writers on the point at issue would be of considerable interest. I can only suggest that prima facie a solution must be sought along the same lines as in the population case, namely by inquiring whether, if money were kept constant, the owners of the new or ex-new increments of capital would have a motive for increasing over a

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[1] Cf. Pigou, *Industrial Fluctuations* (2nd edition), p. 255.

[2] The references are *Trade Depression and the Way Out*, p. 100; *The Theory of Unemployment*, p. 206; *The Rate of Interest in a Progressive State*, p. 11; *The Theory of Wages*, pp. 134-5. My italics.

> period of time the proportion of their real income over which they hold command in monetary form, and, if so, at what rate, on various hypotheses, this process would at any moment be occurring.

Of course, when we have discovered what policy the maintenance of equilibrium would involve, it does not follow that we should adopt that policy. There are other considerations, as Mr. Harrod has shown, to be taken into account : not every departure from equilibrium has fatal consequences, and we must act on a balance of considerations.[1] But the preservation of what I will still venture to call equilibrium between real Saving and Investment is, at the least, one consideration among others. As I have tried to show, there seems to be a long road to travel before we can be quite clear what, under all the various possible conditions of the several kinds of progress, it entails. But I feel pretty sure that we shall get no way at all if all kinds of progress are to be smothered up together in the blanket of the Grand Tautology!

DENNIS ROBERTSON.

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[1] Both Professor Pigou and Mr. Meade are careful to disclaim ethical implications for their "standard" or "equilibrium" systems.

Rejoinder to Mr. Robertson

In Part I of the article referred to I considered various possible monetary policies intermediate between and including those of stable commodity prices and constant money income. These were assessed by reference to the relations they generated between prices, wages, labour productivity, the dead weight of debt, the productivity of fixed instruments, and profits, and an attempt was made to find the best course by reference to these criteria. Part II was negative. It was designed to dispose of an objection to any of these policies other than that of constant money income.

The objection referred to seeks to make use of the principle that the total of new loanable funds should be kept equal to the new savings of the community, and alleges that any infusion of new credit intended to increase money income and so prevent or mitigate a fall of prices must make the total of new loanable funds exceed new savings.

In my judgment the objection overlooks a cross-entry in the national book-keeping arising from the fact that in a progressive community the public will use part of its savings not for loans but to add to its monetary stock. When this deduction from available new loanable funds is set off against the extra funds provided by new bank credits, it is no longer self-evident that an infusion of new bank credits will make total new loanable funds exceed new savings.

Mr. Robertson contends that this argument proves too much, on the ground that according to it any infusion of new credit will always be *exactly* offset by the holding of new money by someone, and therefore that any infusion of new credit, however great, will be " justified." But why justified ? If Mr. Robertson's interpretation of my view is correct—and I will presently offer another interpretation—it does not follow that any banking policy is justified. It only follows that the dictum that new loanable funds must be equated to new savings is no guide to banking policy, since it does not discriminate between different banking policies. I should not have proved that any banking policy is justified, but only that a particular dictum which looked prima facie like a promising guide for banking policy is not in fact a good guide and leads nowhere. (I may say in passing that this dictum has no relation to Mr. Keynes' famous theorem regarding the equilibrium between savings and investment, which I believe to be fruitful, for he uses savings in a different and abnormal sense, and discussion of his theorem would lead us on to quite different terrain.)

Mr. Robertson accuses me of succumbing to the charms of tautology.

But I would point out that tautology has played a notable and useful part in economic theory, especially in checking up on fallacies that involve the omission of a cross-entry. If new savings and new loanable funds are so defined that they must always be equal, and then a certain banking policy is condemned on the ground that it would cause an excess of new loanable funds over new savings, it is not a wholly useless task to point out that this condemnation rests on insecure foundations.

As a matter of fact, if challenged, I was prepared to give a definition of new savings which would rescue the dictum from futility. A certain part of public savings are devoted to the holding of extra value in the form of money. Define the part so absorbed in any period as the increment in the value of the community's monetary holding in that period. Total new savings are then the public funds put out to loan plus this value. Total new loanable funds are the public funds put out to loan plus the new bank credits. Total new savings are then equal to total new loanable funds, if the increment in the value of the community's monetary holding is equal to the new bank credit. Now this equation will *not* always hold whatever banking policy is adopted; it will *only* hold if the value of money is stable. For only then is the increment in the value of total money equal to the value of the increment (new bank credit). Thus total new savings will only be equal to total new loanable funds, if the banks provide sufficient new credit to keep the value of money stable. With this definition the dictum becomes fruitful once more.

It might be urged that it becomes too fruitful, because it narrows down the area of legitimate banking policy too much. But it must be remembered that the measure of monetary value is still left undefined, and thus most of the possibilities discussed in Part I of my article would still be left open.

Unfortunately Mr. Robertson himself precludes me from coming to the rescue of the dictum in this way. He writes (in the para. labelled (i)) that if the value of a given stock of money increases through a fall of prices, this increment of value must not be reckoned as saving. No attempt should be made to utilise this " non-existent act of abstinence." Presumably by parity of reasoning, when prices rise, the consequent decrement in the value of a stock of money must not be reckoned as dissaving. He may be right. I cannot argue the point, since it is a matter of definition. But if he holds to this definition, then the value of saving absorbed in monetary holdings in any period is always equal to the value of the addition to the monetary stock (i.e. of the new bank credits), and the total new loanable funds, *whatever* the banking policy, are always exactly equal to the total new savings. Thus it is Mr. Robertson who is the victim of the very tautology which he seeks (unjustly) to attribute to me. He defines the absorption of saving in monetary holdings in the one way that necessarily reduces the dictum to a tautology and renders it useless as a monetary guide.

I am willing to acquiesce in either alternative. On one definition of the value of savings absorbed in monetary holdings, new loanable funds are equal to new savings, only if the banks pursue a policy which keeps the value of money stable—the definition of stability remains to be determined, but any one will do for this particular purpose. On the other definition new loanable funds are equal to savings whatever the banking policy. Only when an attempt is made to argue that the infusion of new credit, designed to keep the value of money stable, makes new loanable funds exceed new savings and depresses the market below the equilibrium rate of interest must I make my protest.

I confess that I am unable to follow the later part of Mr. Robertson's first paragraph. But the general tenour of the paragraph labelled (i) prompts me to some final reflections. Mr. Robertson is considering what the public will do about money when technical progress is afoot. I agree that there is no reason why they should increase the proportion of real income held in monetary form. I certainly did not argue that they would. But if a regime of stable prices is maintained, as I assumed in my Part II, they will desire to increase their holding of money (quantity). I assume that stable prices have been maintained, are maintaining and are known to be about to be maintained. Of course they may choose the alternative of circulating their money more quickly. In this case no new producers' credits will be required to keep prices stable. But assuming the opposite, they will assuredly desire to add to their stock of money.

I feel that Mr. Robertson's difficulties arise from his method of approaching the problem. I suspect that he illicitly assumes that the period prior to that considered was one of complete stationariness. Now no doubt it is interesting to consider what happens in the transition from a stationary period to one of advance. The problem is complex, since in the general uncertainty about what the banks and other people will do, there is a great deal of indeterminateness with regard to what the representative person will do with his money. Arbitrary assumptions have to be made. And on certain quite reasonable assumptions curious and untoward repercussions may occur, even if a stable money policy is maintained. But these problems throw little light on a period of regular advance. The difference between the two sets of problems is analogous to the difference between the dynamics of getting a train to move and the dynamics of a train in motion at a constant velocity. I was concerned to investigate the latter problem, and for that purpose it is proper to take a cross-sectional view, assuming that the immediately preceding and succeeding periods yield similar developments, and to find out what assumptions with regard to the increase and mutual relations of the factors concerned are self-consistent and consistent with normal economic motives. One result of this investigation was to show that the assumption of a steady infusion of new credit by the banks is consistent with regular advance and normal monetary behaviour by the general public. This kind of investigation is not likely to provide a ready-made explanation of the trade cycle. But it may well expose the weakness of erroneous explanations.

R. F. HARROD.

Book Reviews

Beiträge zur Geldtheorie. Edited by F. A. von Hayek. Julius Springer. Vienna. 510 pp. Rm. 28.60.

Whether the " omnibus " method of publication is well suited to works on economic theory may be doubted; it exploits the consumer by imposing the limitations of joint supply, and incidentally it sets the reviewer a task which is most alarming. There are contained in the present volume (in addition to a short paper on exchange policy, written by Wicksell in 1925), four essays, each of which is the length of a small book. Professor Marco Fanno writes on " The Pure Theory of the Money Market "; Dr. M. W. Holtrop on " Velocity of Circulation "; Mr. J. G. Koopmans on " Neutral Money "; Professor G. Myrdal on " The Equilibrium Concept as an Instrument of Monetary Analysis." The papers generally summarise work which has already appeared in the author's own language, and they have been chosen as representing some of the most important work recently done on monetary theory in those countries whose languages are not widely read by economists. English readers may regret that the further mercy has not been done them of making these contributions available in English; for works as difficult as these the barrier of even a usually intelligible foreign language remains considerable.

Since the editors of Economica have consented to ease the task of the reviewer by permitting a division of labour, I propose in the present note to confine myself to a discussion of the essays by Professor Fanno and Professor Myrdal; those by Dr. Holtrop and Mr. Koopmans will be discussed below.

Of the various streams of economic thought which have sprung from that great work, Wicksell's *Geldzins und Güterpreise*, two only are generally familiar to the English reader. There is the school of Professor Mises and Professor Hayek; there is the school of Mr. Keynes. It is perhaps fortunate that these do not in reality exhaust the list. Wicksell's influence has also made itself felt in Italy, in the work of Professor Fanno and Professor del Vecchio; while his own compatriots, with the advantage of a much longer continuous discussion of his ideas than has taken place anywhere else, have not unnaturally produced neo-Wicksellian work of first-class importance. Most of the ideas of Professor Davidson and Professor Lindahl are still unfortunately hidden from the direct inspection of the outside world, but some impression of the very important discussions which must have been going on in Sweden can now be got from Professor Myrdal's essay.

Professor Fanno's paper is based upon his book, *Le banche e il mercato monetario*, which appeared in 1912. Professor Fanno was thus one of the earliest economists outside Sweden to incorporate Wicksellian elements into his thought on monetary questions; consequently it is not surprising that his theory, being in essentials twenty years old, should, in this rapidly developing subject, appear to some extent quaint and archaic. The combination of a Fisher quantity theory with a Wicksellian natural rate theory lends a rather odd look to Professor Fanno's " fundamental equation "; though it remains to be seen whether this is a worse alternative than that taken by most recent writers—of assuming away all forms of money but bank credit. But the same line of thought is probably responsible for another of Professor Fanno's peculiar doctrines; that, when we compare one " equilibrium " with another, the adjustment to a change in one set of the factors affecting the demand for bank credit takes place through a complementary alteration in another set of these factors on the demand side (generally prices); so that, excepting for the case of an autonomous change in the supply of credit, it is only in the transition from one such equilibrium to another that the Wicksellian scheme is important. But, in analysing such transitions, it is obvious that great importance must be attributed to the assumptions made about the anticipations of entrepreneurs. Professor Fanno's stress on this factor of anticipation is responsible for the one important respect in which he holds himself to differ from Wicksell—that, in periods of transition, when the attainment of a new equilibrium is expected (for example, in seasonal fluctuations), it may be possible for the rate of discount and the rate of profit to remain in their Wicksellian equilibrium relation, while there are fluctuations in prices and fluctuations in the volume of bank credit. Such fluctuations, however, would not tend to be cumulative.

Professor Fanno is evidently most anxious not to exaggerate the importance of the monetary factors he analyses in the causation of the Trade Cycle. With few exceptions, booms are started by non-monetary causes; but it is the increasing difficulty of supplying enough bank credit which checks the boom. The rising discount rate, however, acts at last as a " psychological agent," and converts the boom into a slump by violently shifting expectations in a pessimistic direction.

The theory which thus emerges is an eminently sensible one; in view of present differences among monetary theorists it remains to be seen whether we can really do much better. But there are several points where it is content to use rather loose terms—such, for example, as the " rate of profit," which Professor Fanno substitutes for Wicksell's natural rate. It is his refusal to be content with such inexactitudes which is, on the other hand, the strength of Professor Myrdal.

The latter's essay seems to me quite the most exciting work on monetary theory which has appeared since Mr. Keynes' *Treatise* and Professor Hayek's *Prices and Production*. Whether his conclusions are right or wrong (and some even of his major conclusions still leave me afflicted with grave doubts), there can be no question at all that his work marks a very definite step in advance. It is even one of those books one feels loath to criticise, for fear that one's criticisms may perhaps deter some reader from examining the book itself—and that would be a disaster.

Professor Myrdal's subject is twofold. On the one hand, he is concerned to submit the argument of *Geldzins und Güterpreise* to the searching criticism which the latter parts of that book have so obviously long needed; here, then, he is only concerned with restating Wicksell's argument in a form in which it shall be rigorously true. But, on the other hand, he is also concerned with the more ambitious attempt to restate it in a form in which it shall be capable of being used as a criterion of practical monetary policy; so that we shall not only be able to say, after the trouble has occurred, that the natural rate must have got out of equilibrium with the market rate, but shall be able to detect incipient trouble and so prevent the disease from developing. It is hardly surprising that the intellectual powers which acquit themselves so brilliantly in the negative criticism of Wicksell, possibly achieve a less certain victory in the second and much harder task.

Wicksell, it will be remembered, had put forward three conditions of monetary equilibrium; (1) that the market rate of interest should equal the natural rate (i.e. the technical marginal productivity of real capital); (2) that the capital market should proceed as if " real capital were lent *in natura* "; (3) that the price-level should remain unchanged. Professor Myrdal takes each of these conditions in turn and submits them to searching examination. He finds, as others have found, that (1) and (2) are consistent, but that the fulfilment of conditions (1) and (2) does not necessarily imply the simultaneous fulfilment of (3). So far, indeed, he is in substantial agreement with other writers; but beyond this he diverges sharply.

In Chapter IV, devoted to the first Wicksellian condition, he begins by showing that the purely technical character imputed by Wicksell to the natural rate is due entirely to the simplicity of Wicksell's assumptions—one finished good and one original factor of production. (An argument made familiar to us in England by Mr. Sraffa.) Once we allow for the multiplicity of finished goods, the natural rate can only be interpreted as an expected rate of yield, in monetary terms. But this interpretation not only makes the natural rate dependent on psychological elements (the expected course of prices), but it also raises serious difficulties about " maintaining capital intact." At the end of a long argument (too long, in spite of its great importance, to be even summarised here), Professor Myrdal concludes that the first Wicksellian condition can only be interpreted as implying equality between the value and cost of production of new capital goods (whether or not they are " replacement " goods —the distinction between new and replacement goods is abandoned). He recognises that both terms of this new equation must be regarded as dependent upon the market rate of interest, a change in which will react upon both.

Chapter V is concerned with the second Wicksellian condition, which is reinterpreted as meaning equality between savings and investment. By an argument parallel to that of Mr. Keynes (though much greater care is taken over the question of replacement), Professor Myrdal shows that this condition reduces to substantially the same thing as the value-cost equation which resulted from the first condition.

But (and this is of the first importance in connection with the application of the doctrine), such a difference between savings and investment will never be capable of detection by statistical inquiry after the event. For the difference between investment and savings (or, what comes to the same thing, the difference between value and cost of capital goods) is always taken up by *profits* and *losses* which are not distinguishable *ex post*. It is only *ex ante*, in the anticipations of entrepreneurs, that a difference between investment and savings may show itself.

In Chapter VI, which deals with the third Wicksellian condition, Professor Myrdal's conclusions are even more radical. His reinterpretation of the natural rate as a monetary concept involving psychological elements, makes it necessary for him to abandon not only the price-stabilisation of Wicksell but also the correlation of price-level and productivity, deduced by *neutral money* theorists. It is theoretically conceivable, he begins, that *the* condition of monetary equilibrium, which had emerged from his previous analysis, might be satisfied with any trend of the price-level, provided interest rates were properly adjusted to that trend. In fact, however, the possible movements are limited by the existence of particularly *sticky* prices (long-term contracts, wage rates, etc.), so that a policy which sought to preserve monetary equilibrium would in fact aim at stabilising such relatively sticky prices. But although it would aim at this sort of stabilisation, the means of stabilisation could only be found by a maintenance of the value-cost or savings-investment relation previously described, since the stickiness of the sticky prices ensures that there would be no tendency for them to move until monetary equilibrium had already been disturbed, and the damage therefore already done.

These three chapters contain the core of Professor Myrdal's work. There is much in the remainder of his essay which is of intense interest; the complications due to risk, to monopoly, to international trade, are each examined; statistical methods for testing the existence of monetary equilibrium are discussed. But these questions really arise only if we have first accepted the reasoning of the crucial three chapters; it therefore seems hardly possible to discuss them in a notice like the present.

It thus seems best to conclude with a very tentative criticism of that central argument. If one accepts Professor Myrdal's criticism of Wicksell (and most of it, in my view, one must accept), the question remains, "What is monetary equilibrium for?" Wicksell (and usually Mr. Keynes) would equate the market rate of interest to the natural rate in order to stabilise the price-level; Professor Hayek would keep money neutral in order to prevent distortions of the productive process; these are at least moderately clear aims. But what is the point of Professor Myrdal's monetary equilibrium ? Certainly not to attain any particular end which he himself regards as socially desirable; he is very careful to explain this. The only clue which he gives is a reference back to Wicksell—that monetary disequilibrium implies the setting in of a " Wicksellian cumulative process." But, at the stage he has reached, has he the right to refer back to Wicksell any longer ? Just what is the precise difference between such a cumulative process and the sort of inflation which he would consider, theoretically at least, as consistent with monetary equilibrium ? One gets certain vague ideas from his book, but nothing definite enough; and nothing which altogether convinces one that the concept, in the form in which he has left it, remains an essential part of monetary theory.

If this criticism is entirely misplaced (which seems very likely) Professor Myrdal's essay may be taken at its face value as a contribution of the first importance towards the control of the Trade Cycle; if it is not, his work remains as a hardly less significant turning-point in the development of monetary theory. J. R. Hicks.

Dr. Holtrop analyses in his essay, *Die Umlaufsgeschwindigkeit des Geldes*, the factors which determine the velocity of circulation of money. He considers the causes of changes in the velocity of circulation and the effects of such changes on the value of money. The problem of changes in the value of money is important, but one cannot agree with Dr. Holtrop when he says that it is the central problem of monetary theory. The most important problem with which monetary theorists have to deal is surely the relationship between money and economic equilibrium as a whole.

Dr. Holtrop explains both the demand to hold and the velocity of circulation approaches to the theory of the value of money. He admits that both these methods have a *raison d'être* but considers that the velocity of circulation method is better suited for the treatment of dynamic problems. There seems to be no justification whatever for such a preference. Further, although Dr. Holtrop allows the demand to hold approach as explained by Professor Pigou, he objects to the conception " demand for money to hold " because a money balance has in itself no " positive utility." This objection cannot be sustained if it is assumed, as Dr. Holtrop at times assumes, that there is uncertainty.

Dr. Holtrop considers the effects of changes in the velocity of circulation on the price-level. He maintains that there is one kind of change in the velocity of circulation which has no effect on the price-level because it is automatically accompanied by a corresponding change in the amount of transactions performed with the aid of money. These changes are due to alterations in the extent of the differentiation of the productive process. If, for example, a production process which was previously carried out by one business unit is now carried out by two business units there must be an increase in the stream of goods coming on to the market.

Dr. Holtrop maintains, however, that such an increase in differentiation not only increases the goods stream, but also the money stream, because the velocity of circulation automatically increases. This argument is not valid. The increase in the number of transactions involving money payments will cause a fall in the transaction price-level, while the transaction-velocity of circulation can be assumed to remain constant. It must be assumed that, before the change occurred, the business unit concerned did not hold any unnecessarily idle money balances. Thus the transaction-velocity of circulation of money cannot be increased just because there is an increase in the number of transactions to be carried out with the aid of money. It is admitted, of course, that alterations in the extent of the differentiation of the productive process may cause changes in the velocity of circulation because of changes in the size of the business unit.

The main part of this essay is devoted to a very good detailed analysis of the actual factors which determine the velocity of circulation. Dr. Holtrop approaches the problem from an interesting angle. He explains that the problem of velocity can be considered as a problem of financing. Each business unit possesses funds (*Vermögen*) which include all the means at its disposal. On the other hand, each business unit has investments (*Aufwendungen*), that is, assets obtained by the application of its funds. The difference between funds and investments is equal to the money balance held. The velocity of circulation can thus be regarded as depending upon the extent to which business units are successful in keeping funds and investments equal. It should be noted that consumers are treated in the same way as business units. Dr. Holtrop discusses the various causes of fluctuations in the total assets of a business unit. He then proceeds to consider the extent to which credit facilities make possible the equalisation of funds and investments. In this connection he examines the various ways in which a firm raises its funds and considers in detail the effects of credits granted by suppliers and purchasers. The analysis throws a good deal of light on some of the problems of the velocity of circulation.

Mr. Koopmans' essay, *Zum Problem des "Neutralen" Geldes*, contains the most important results of his work on "Money and Economic Equilibrium" which he intends to publish in the Dutch language. All economists interested in monetary theory will be grateful for the presentation of Mr. Koopmans' ideas in this more accessible form. The essay is extremely interesting and raises many important questions concerning the conception of neutral money.

Mr. Koopmans discusses two main problems; whether, or under what assumptions, there is a conflict between neutral money and stable-value money, and whether the neutrality or stability principle should be advocated for policy. Mr. Koopmans is able to show clearly that a stable value of money does not necessarily imply a neutral money system. He also provides very good reasons for his advocacy of a policy of neutral money rather than stable-value money so far as he considers such a policy is technically possible.

Money is defined as being neutral when the economic process in a money economy corresponds perfectly to that in a barter economy as described by the theory of equilibrium. It is assumed that the frictions which would exist without money acting as a medium of exchange are eliminated, and, at the same time, it is assumed that the specific changes which result from the actual introduction of a medium of exchange are non-existent. The meaning and purpose of neutral money is thus to unite the well-known advantages of money with the elimination of the disadvantages such as inflation and deflation. Mr. Koopmans distinguishes between two kinds of neutrality of money; the neutrality of abstract money, that is, of money as a unit of account, and the neutrality of concrete money, that is, of money as a medium of exchange. According to Mr. Koopmans, abstract money is only neutral when money values do not divert an individual's attention from the " real " values of goods and services. Concrete money is only neutral when it does not disturb the equation between total supply and total demand as explained in Say's *Théorie des Débouchés*. This condition involves the maintenance of the money and equilibrium rates of interest equal as has been advocated by Wicksell and others. The distinction between neutral abstract money and neutral concrete money does not appear to be important. If concrete money is neutral, no change in money prices can be said to create a money illusion. If, for example, an invention changes the relative values of certain factors of production, long-term money contracts and other inflexibilities in money prices may hinder the establishment of the new equilibrium. These difficulties cannot, however, be attributed to a money illusion. One can envisage similar difficulties in a barter economy in which there were uncertainty, long-term contracts and other inflexibilities. It is only when concrete money is not neutral, that is, during periods of inflation and deflation, that one can speak of a money illusion.

Mr. Koopmans' main thesis is that neutral concrete money involves a constant total quantity of money so long as it is assumed that there is no new hoarding or dishoarding. New hoarding should, however, be compensated by an increase in the quantity of money. Similarly, new dishoarding should be compensated by a decrease in the quantity of money. Thus, changes in population and in the degree of integration of the business and industrial structure are considered to necessitate a change in the quantity of money in so far, and only in so far, as they cause new hoarding or dishoarding. Mr. Koopmans also maintains that certain changes in the conditions of the supply of and demand for goods cause new hoarding or dishoarding which must be compensated by changes in the quantity of money. Whether one agrees with all Mr. Koopmans' conclusions, or not, there is no doubt that his detailed analysis of the causes and effects of hoarding and dishoarding demand the most careful consideration.

It should be noted here that the definition of hoarding which is given on pp. 263 and 264 is not satisfactory. New hoarding is defined as being any increase, and new dishoarding any decrease, in the cash balances of individuals. The condition under which neither hoarding nor dishoarding takes place is said to be identical with the condition under which the nominal amount of all individual balances remains the same; that is, the condition under which every individual's income and outlay during a given period of time are equal. According to this definition, when individuals increase the nominal amount of their cash balances in order to maintain the same " real " value of their money holdings when the quantity of money is increased and prices rise they perform new hoarding. Further, hoarding as it is generally conceived, can take place when the quantity of money is constant, that is, when the nominal amount of cash balances is constant, and the community's income and outlay are equal, and Mr. Koopmans appears to admit this.

J. C. GILBERT.

Economic Organisation of the British Coal Industry. By A. M. NEUMAN. Routledge, 1934. xxi+537 pp. 15s.

There are many kinds of coal. Durham alone distinguishes fifty-three main classes divided into many subclasses. Nor is it true that the prices of the different kinds move more or less together. To take a striking example, " while at the beginning of 1921 the Welsh Large Steam Coal for export (f.o.b.) was nearly twice as expensive as the Lancashire Best Coal (on wagon at pit), at the end of the year the reverse position occurred and the Lancashire coal was about 60 per cent. more expensive than the Welsh Large Steam for export " (p. 21). Again, the price of small coal may fall 25 per cent. while the price of large coal of the same kind at the same place remains steady (p. 89). A given class of coal may find its closest rivals not in other classes of coal but in oil, or electricity, or water-power. Further, coal is much cheaper per ton than most commodities, so that transport charges create local monopolistic advantages to a greater extent. Finally, " coal enters the economic structure in all stages of production," so that " it is impossible to consider the coal industry in a watertight compartment " (p. xv).

Dr. Neuman very properly stresses the difficulty of generalising about the coal industry and then, like a sensible man, proceeds to generalise about it. His book is a very full survey of the varying fortunes, or rather misfortunes, of the British coal-mining industry since the war. It is clearly based on extensive research and reading, and is a really important contribution to the subject.

Yet, despite his impressive array of facts and figures, he does not completely explain why the output of British coal since the war was 10 to 20 per cent. below the 1913 output. He discusses the demand for coal at some length. He thinks the part played by substitutes for coal in diminishing the demand for coal is often exaggerated. Thus, " to a great extent oil is supplying ships actually representing the newly constructed tonnage, while a tonnage equal to the pre-war figure is still carried on coal-power " (p. 70); the bulk of the new hydro-electric power in Europe " was absorbed in entirely new industrial developments or consumptive uses "

(p. 71); and so on. But surely the greater use of substitutes has prevented the world consumption of coal from increasing more rapidly, so that a closer examination of the reasons for it would have been relevant. On economies in the use of coal he observes that they " after some time help to increase the general demand " and quotes Jevons's remark that " it is wholly a confusion of ideas to suppose that the economical use of fuel is equivalent to a diminished consumption." But is this correct? Suppose that technical progress enables nine tons of coal to do the work ten tons did before. Is not this nearly equivalent to a fall of 10 per cent. in the price of coal, but no technical economies in its use? And can Dr. Neuman assert that a fall of 10 per cent. in price will always lead, after a time, to an increase of 10 or 11 per cent. in the amount bought? If not, then economies *may* make the consumption of coal less than it would otherwise have been.

Anyway, the world consumption of coal since the war increased considerably less than the world consumption of most commodities. But it did increase; it was around 1,200 million metric tons in 1913 and over 1,300 million in the peak year of 1929. Why, then, did net British exports of coal diminish from 100 million tons in 1913 to 70 million a year in 1925-8 and 81 million in 1929? Here is the main source of the decline in demand for British coal. Dr. Neuman has many informative things to say, but he does not give a complete answer. For as between, say, 1924 and 1929 most classes of British exports increased: the exceptions were very important, but they were exceptions. The overvalued pound, for example, which is always produced in this connection, does not explain why coal exports fell off when other exports were increasing. It seems at least possible that British coal was becoming more difficult to win relatively to coal in other countries, but Dr. Neuman says surprisingly little about this: possibly he has considered this explanation and rejected it.

Dr. Neuman has an interesting discussion on demand curves. It is quite possible that a fall of, say, 10 per cent. in the price of a given type of coal would greatly increase the amount bought, while a rise of 10 per cent. would curtail it only slightly. Nobody denies this, although theoretical economists are sometimes inclined to parade " point elasticities " as though they could be applied to significant finite changes of price. Again, nobody denies that it may take some time for demand to adjust itself fully to a change in price, although Dr. Neuman is justified in stressing this difference between what he calls " short period " and " long period " elasticities. But he goes further. He attacks Marshall for saying that " if a fall in price from say 16d. to 15d. per lb. of tea would much increase his purchases, then a rise in price from 15d. to 16d. would much diminish them " and wants, apparently, one curve for going down and another for coming up. Doubtless a fall in price may rouse expectations of further falls, and similarly with a rise, but it seems reasonable to suppose that after things have settled down the amount bought at a given price will be about the same whether the previous price was higher or was lower. A hypothetical demand curve, showing the amounts which would be bought in equilibrium at each of a series of prices, is admittedly very different from a graph showing the historical course of events, but twin hypothetical demand curves for each commodity seem to denote inconsistent action on the part of consumers. Once I have really settled down in Paris, what I do there does not depend on the route by which I came.

Only a small part of the book, however, is concerned directly with these questions. Dr. Neuman describes and discusses the organisation and problems of the industry, the policies of the Labour, Liberal and Conservative parties concerning its reorganisation, and the part played by the State since the war, concluding with a detailed and illuminating analysis of the Coal Mines Act of 1930.

Our compulsory national cartel must have prevented a fall in the price of coal. Dr. Neuman gives examples of some districts undercutting others, and of evasion of the district minimum prices; clearly some pits wanted to sell more cheaply and to run nearer to full capacity. The prohibition of transfers of quotas between districts must have checked the expansion of the districts with lower costs. Although most districts seldom produced up to their allotted tonnage, many individual pits produced their full quota and some purchased quotas from others (in the same district). The output of British coal was 258 million tons in 1929 and 209 million in 1932, and the average pithead price per ton was practically unchanged. Dr. Neuman explains this (p. 452) by the high proportion (70 per cent.) of labour costs, and the need for a reduction in the cost of living before wages are reduced. This does not seem convincing. Apart from the fact that the cost of living largely reflects the wage level, different pits have different costs and even if wages were constant some pits would prefer to cut prices to revive a fallen demand rather than to keep prices unchanged. Nevertheless it is a remarkable fact, which tells in favour of Dr. Neuman's thesis, that the average declared value (f.o.b.) per ton of British coal exported was actually a penny higher in 1932 than in 1929.

The concluding sentence of this scholarly work can conclude this review also. " The only way out of the difficulty is to return the whole management of coal affairs without political intervention to those who have in the past successfully steered the fate of Britain's basic industry through many difficulties and many troubles."

FREDERIC BENHAM.

Plan or No Plan. By BARBARA WOOTTON. Victor Gollancz Ltd. 1934. 352 pp. 5s.

The first chapter of Mrs. Wootton's book (" The Nature of an Unplanned Economy ") shows how price movements regulate production, the distribution of labour and the investment of savings in an unplanned economy. But it shows also that the price mechanism does not always work with full precision and that in such cases there is nothing substituted to take its place. For instance, public authorities are not able to set to work again those workers for whom commercial industry finds no place: " their activities must not encroach on the sphere which is still regularly assigned to the price economy " (p. 36). On the other hand: " Where both production and purchase are guided by price movements, both producers' and consumers' problems are immensely simplified, since reference can be made to an index which not merely registers that more of this and less of that is demanded, but which gives also a definite *quantitative measure* of such changes in demand " (p. 41).

In Chapter II (" The Nature of the Russian Planned Economy ") it is shown that the same problem—what to make, and in what quantities—is solved in the Soviet Union by a general economic plan. But here also it is not solved with full precision. Consumption is decided by authority, and it is impossible to estimate the costs of production. " The measurement of interest in quantitative terms becomes so difficult that current rates of interest cease to be any use as guides to practical policy " (p. 100). The methods of controlling the supply of labour are largely independent of the price mechanism, the movements of workers being dictated by authoritative decisions. Thus, although the production programmes of Soviet Russia are said to be controlled by prices, the likeness with an unplanned economy is only superficial; for the incomes of the enterprises include substantial grants from public funds, and the realisation of large profits is no reason for expanding an industry.

At the beginning of Chapter III (" The Achievements and Possibilities of an Unplanned Economy "), Mrs. Wootton emphasises that her " concern is rather with the weaknesses of the (present) system than with its achievements . . . because success cannot be improved upon: failure possibly can " (p. 103). Nevertheless she is not unjust. She shows that the present difficulties are not created by production for profit nor by overproduction or underconsumption. The remarks on business cycle theories are quite excellent. It is very interesting that a socialist compares money with the oil in the engine and concludes: " Change the oil and that may be the end of the talk about redesigning the whole engine " (p. 143). But it is not made altogether clear why in the end redesigning is proposed, and it would appear that the author hardly appreciates the full difficulties of planning. Against the unplanned economy it is said that the incomes are too unequal and that it is the tendency of any competitive industry to outrun the point at which production ceases to be profitable. " If the output of an industry exceeds by 10 per cent. the quantity which can be profitably sold, then it is not 10 per cent. of the total on the market, but the whole 100 per cent. that suffers from the consequent fall in selling prices " (p. 152). This may be true. But the whole suffers correspondingly less, and this is surely hardly a sufficient reason for building a whole new economic system—at least so long as one cannot prove that this new system is certain to work more exactly.

In Chapter IV on " The Achievements and Possibilities of a Planned Economy " it is clearly stated that the problem of comparing one person's trouble with another person's satisfaction cannot be solved in a planned economy " for the simple reason that it involves the comparison of incommensurable quantities " (p. 168). One " solves " the problem by authoritative decisions! And that means the giving up of the free choice of consumption. But Mrs. Wootton is lightly comforted: in the unplanned economy also consumption is not really free. Its " whole trend and character is determined far more by producers than by those who actually use the goods. And in this respect there is probably not very much to choose between a planned and an unplanned system " (p. 174). An enormous error! It is characteristic that in the unplanned economy the consumer is (in the margins of his income) absolutely free. His demand regulates the whole production, whereas in a planned economy his consumption is decided for him by authority and the consumer can buy, not what he wants, but what there is, as Mrs. Wootton tells us about Soviet Russia (p. 94).

Mrs. Wootton shows that the achievements of the Russian planned economy are of limited demonstrative force: the primitive stage of economic development and the poor supply of material goods make all things wanted so urgently that it really does not very much matter which is produced first. One must also not be deceived by superficial organisation. If the planners make mistakes they are not obliged to reveal these mistakes " in the particular form of unemployment and unused plant " (p. 191). Afterwards, certainly, Mrs. Wootton calls it an advantage that the prices which in an unplanned economy must be taken as independent variables, " under a planned system . . . may be manipulated by the planners themselves to suit the convenience of their schemes " (p. 202). But that is no advantage; it is mere arbitrariness.

The arguments of Chapters I-IV do not give the right to state in Chapter V (" What Next ? ") that, wisely operated, the planned economic system has the power to steer clear at least of the cruder and more obviously deplorable disasters into which an unplanned economy habitually runs (p. 256). This chapter inquires into the difficulties arising from the fact that planning implies full control of the main instruments of production and, in the absence of a social revolution, implies the persistence of class and income differences. That Mrs. Wootton regards this difficulty as the crux of the whole problem again makes it obvious that she does not see the main problem.

Only in the sixth and last chapter (" The Conditions of Successful Economic Planning ") is this main problem mentioned. It is the question: " To what extent does successful planning imply dependence on, or independence of, a price mechanism ? . . . This, of all aspects of planning, seems to me most urgently to call for further investigations " (p. 322). But, though the author tells us that happily this problem is beginning to attract the attention of economists, she does not mention the most important theories of Mises, Pierson, Max Weber, Brutzkus, etc., which have shown that the sufficient functioning of the price mechanism is impossible if private property is abolished and the factors of production are not exchanged one for the other. The unknown price for capital destroys the relations between the prices of products and the price of labour, and, for this and other reasons, there is no sufficient economic accountability in a planned economy. Mrs. Wootton admits "that there must be a certain element of arbitrariness in the decisions of the planners." "The planners will say: The production of potatoes makes men healthy, wealthy and wise, and we think, after considering the alternative possible occupations . . . that it would be well to make Sussex much more of a potato-growing county than it is" (p. 324). That is right so far as we have complete communism. Such a system needs no price mechanism. But collectivism does (a system with collective planning and free choice of consumption and labour). This is admitted by the author when she writes: "No planned economy could tackle its job unless it employed some method of reckoning in terms of money prices, on whatever principles these may be calculated. . . . The first function . . . of the price mechanism under a planned economy will probably be to serve as a means of expressing the content of the plans, and therewith also as a means of checking the measure of their fulfilment. That is to say, the plans would take the form of proposals that such-and-such quantities of goods should be produced at such-and-such costs and sold at such-and-such prices" (p. 325). And later: "The planning authorities' power of control over the market by manipulations of prices and production, as, for example, by subsidising the manufacture of one article out of the profits of the sale of another, enables it to make the mechanism, which in the unplanned economy is wholly dominant, largely subservient to its will. In a sense, in fact, the planners can almost make their domestic plans come right" (p. 347).

Against these arguments there must be raised the following objections. 1. The main problem is wholly overlooked in the remark, "on whatever principles the prices may be calculated." 2. It is impossible to stipulate the prices in such a manner that they correspond with the scarcity of the goods and that the prices cover the costs. Plans cannot regard all wishes of free resolving consumers and therefore the stipulated prices cannot be identical with the market prices. 3. If the planners make their plans come right, these plans are no plans. It is neck or nothing. Planned economy is incompatible with free consumption and free choice of labour. In the communist society the price mechanism is only a farce. It is unnecessary and impossible. In the collectivist economy it is necessary but impossible. And therefore the collectivist economy cannot exist. In stating that no society can succeed without use of the price mechanism, Mrs. Wootton is in fact abandoning her ideas of planning. And that would be a fitting conclusion to the high level of argument shown in this exceedingly interesting book.

Georg Halm, Würzburg.

A Short History of the Worshipful Company of Bakers of London. By Sylvia Thrupp. The Bakers' Company. 15s.

It appears from the foreword that the text of this book was presented to the Company on the conclusion of the donor's year of office as Master. Mr. F. A. Mostyn is to be congratulated not only on a gift which was well worth making but also on his choice of an historian. The Bakers have many claims to notice. They are one of the most ancient of the livery companies, dating from at least as early as 1155, when they are mentioned in the Pipe Roll as a gild; for nearly seven centuries they controlled, under the authority of the Court of Aldermen, the manufacture and sale of the staple article of London's diet; their story throughout is rich in material deserving the closest attention of the economist, and they still survive as a vigorous social centre for members of the trade. Miss Thrupp, as would be expected from her work on the Grocers and their distributive functions in *English Trade in the Fifteenth Century*, has produced a sound and valuable study of the Company in its wider aspects. The problems arising out of changes in the value of money, labour troubles, seasons of scarcity, unfair competition, civic experiments in socialism and faulty methods of striking a balance between the producer and consumer are analysed and discussed with admirable clearness. For those mainly interested in the Company itself Miss Thrupp has provided chapters dealing with the ancient hall and its contents, pageantry and social life, notable members of the Company and other topics. But there is no division into portions suitable for readers of different tastes—the whole book is written in so vivid and interesting a fashion that it can be read with enjoyment and profit alike by the serious student of economics and the general reader.

A. H. THOMAS.

Land Problems of India. By RADHAKAMAL MUKERJEE. Longmans, 1933. 362 pp. 9s.

Industrial Labour in India. By S. C. PANANDIKAR. Longmans, 1933. 294 pp. 9s.

Problems of Rural Reconstruction in India. By F. M. DE MELLO. Oxford University Press, 1934. 66 pp. R.1.

Professor Mukerjee's study of India's land problems, based on a series of lectures delivered at the University of Calcutta, gives a scholarly account of the origin and nature of the various Indian land tenure systems, and presents a vivid picture of present-day defects and problems. The author writes from a broad, sociological point of view, utilising comparisons and analogies from other times and other countries, with excellent effect. No one can read this book without realising the fundamental importance of land reform in India.

On the other hand the reader who has not already a working knowledge of Indian land tenure will find it somewhat difficult to follow the earlier chapters. These deal with the problems and defects of special areas, before any general explanation has been given of the main features of the principal tenure systems. Moreover certain passages are vague and obscure, particularly where little indication is given of the date or period to which reference is made. The impression is given that the lectures were only hastily revised before publication. The chief defects of present-day conditions are summarised as follows: small and often uneconomic holdings ("no man should suffer imprisonment with hard labour in one-eighth of an acre of land"); uncertain tenures; widespread and permanent indebtedness; the transference of land-ownership to non-agricultural classes; and the disruption of village communes (involving the disuse of former customary regulation of irrigation, pasturelands, etc.). The rise of landlordism has obscured tenant and village rights, and tenancy legislation has failed to correct the evils resulting from the policy adopted under early British rule.

For the solution of these evils Professor Mukerjee proposes valuable and far-seeing remedies. His recommendations are designed to promote three main objectives: (i) a modified State landlordism, according to which the Government demand from agriculturists should be based on economic rent, thus securing an adequate standard of life to the peasant; (ii) a new Zamindarism, shorn of outworn semi-feudal incidents and privileges, which shall lead to a real partnership between landlord and peasant; and (ii) a rehabilitated village community, which shall facilitate co-operation between the peasants and adjust individual and communal rights.

In his *Industrial Labour in India* Mr. Panandikar summarises the main conclusions of the Report of the Whitley Commission, adding vivid, first-hand impressions which give a clear account of existing conditions. He also describes the steps that have already been taken to implement the recommendations of the Whitley Report, and various proposals for reform that are still under discussion. If little new light is thrown on the subject, it can at least be said that those who have not already studied the problem will find the author's account useful and readable.

A warm welcome should be accorded to Mr. De Mello's little pamphlet on *Problems of Rural Reconstruction in India*. It consists of a reprint of a series of articles recently published in the *Times of India*, together with an appendix on the "Economics of Birth Control." The pamphlet forms a useful introduction to the fundamental problems involved, particular attention being given to the problem of indebtedness, subsidiary industries, the co-operative movement, and Governmental policy in general.

VERA ANSTEY.

La Mortalità Antenatale. By SALVATORE ALBERTI. Società Editrice Vita e Pensiero, Milan. 1934. 150 pp. 10 Lire.

The basic materials of this valuable study of spontaneous abortions are the records of the children's hospital of Milan from March 1923 to March 1929. In the case of each sick child entering the hospital, questions were put as to earlier abortions of the mother. This material, as far as it goes, is certainly more representative than are data collected in obstetric hospitals; but it includes only cases of mothers who have had at least one living child. The author shows that the reported abortions amounted to 17 per cent. of the conceptions and he reaches the conclusion that for the total population of Milan the spontaneous abortions amounted to 25 or 30 per cent. of the conceptions during the last ten years. He does not venture an estimate of the number of voluntary abortions.

The study, which is the outcome of research work directed by Professor M. Boldrini in the Laboratory of Statistics of the Catholic University of Milan, is very limited in scope; but it raises many fascinating problems and should be read by all demographers and biologists interested in fertility and abortions.

R. R. KUCZYNSKI.

Essays on Monetary Management. By JACK STAFFORD. P. S. King and Son Ltd. 1933. 230 pp. 7s. 6d.

The contents of this book are sufficiently well indicated by the title. There are three essays, all dealing in an abstract way with problems of monetary management, preceded by an Introduction which gives a brief statement of Trade Cycle Theory as " a framework that will relate the three superficially unrelated essays to each other."

Essay I (" Income and Banking Policy ") deals competently with some details arising out of the most recent English developments of monetary theory. Thus far Mr. Stafford has managed to avoid mentioning a single fact. But Essay II (" The Relation of Banking Technique to Economic Equilibria ") promises differently. The author finds one more rigidity in this world of rigidities—a rigidity of commercial banks' assets. After glancing for one short moment at the English bank balance sheets, we are shown how the reasonable commercial policy of commercial banks may not be the most effective backing for normal Bank Rate policy. The argument is good (especially pp. 66-70), and plays well into the hands of those engaged in the more refined Socialist propaganda. Hovering in the background all the time is the problem of the structure of interest rates and the relationship to each other of demands for loans of different classes. To our disappointment, Mr. Stafford does not grapple with this problem at all (perhaps because the deductive methods of this book would scarcely be adequate).

The third Essay (" Central Banking Problems ") contains a large number of useful points. The author gives good reasons for concluding that, in any case, a Central Bank is inevitably tied to some extent to external objectives. Then he assumes some rigidity internally and proceeds to discuss ways and means whereby the Central Bank can provide for both internal and external situations at once. Though there is nothing entirely new here, the passages on rigidities in price systems (pp. 131-5), and on the widening of the gold-points (pp. 211-12) are particularly good. Some attention to historical examples would have given body to the hints on the difficulties of diagnosis by Central Banks.

There is ample evidence in this book of Mr. Stafford's ability to illuminate practical problems by using his weapons of analysis. Everyone interested in monetary theory must hope that those weapons are to be well used in the future.

R. S. SAYERS.

Railway Economics. By K. G. Fenelon. Methuen. 1932. Pp. xii+228. 5s.

History of the Great Western Railway, Vol. II, 1863-1921. By E. T. MacDermot. Great Western Railway Company. 1931. Pp. xii+654. 10s. 6d.

It could hardly be otherwise in an industry where technical development proceeds apace, that the period of adjustment should be characterised by strains and stresses, appropriate adaptation to which is the price of progress. In the case of transport, this process of adaptation is made singularly complex, in that almost every branch of the industry is operating within a framework of legal control, which not only requires alteration itself but is in constant danger of being invoked, here to defend already existing assets against justified obsolescence, there to render obsolescence premature. The normal factors determining industrial activity become peculiarly subject to the vicissitudes of public opinion and political pressure. Hence the very urgent need for a wide understanding of the issues at stake, and for a common language, a common nomenclature, a common method of approach, with which to lay bare the essentials of the controversy, as controversy there must be. It is surely the peculiar and responsible rôle of economic science to meet this need.

If the value of Dr. Fenelon's *Railway Economics* is assessed in the light of this paramount need, the book must be classed as altogether disappointing and inadequate. For the manner in which the facts and features of the railway world are presented does not, in the main, facilitate the reader's passage from the general to the particular, or vice versa, whilst to do so is surely the prime function of a book bearing such a title.

In an introductory chapter we are reminded that the improved transport of freight furthers the geographical division of labour, and that the demand for passenger transport arises from two main sources, business and pleasure. The more familiar features of the early development of British railways are then given. In Chapter II those special characteristics of the railway industry which have led to Government control are described, and are followed by a brief account of the nature of that control in several countries. Chapter III contains an interesting discussion on the merits of the Departmental and Divisional (geographical) types of organisation respectively. Among subsequent chapters are those devoted to Railway Capital, Labour, Amalgamation, Rates and Fares, and Electrification, but there is little in them that is not readily available elsewhere.

In Chapter X, entitled the "Theory of Railway Charges," the author gives various grounds on which railway companies have chosen to discriminate between different traffics and traders. Unfortunately he extends the use of the word "discrimination" to include not only charging differently for two traffics whose costs of carriage may be identical, but also, charging differently on account of different costs (p. 123), omitting to point out that an *absence* of discrimination in the latter sense is in fact discrimination in the former sense.

Volume II of the *History of the Great Western Railway*, besides relating the history of the company itself from 1863 to the final amalgamation of 1922, records the development from the time of their birth of a number of smaller lines, such as the Bristol and Exeter, the South Devon, and Cornwall Railways, all of whom in the course of time became a part of the Great Western Railway itself. In addition, it contains chapters devoted to the development of locomotives, carriages, and wagons during the period under review.

Much by way of general comment which was written of Volume I[1] applies equally to the present volume. For example, it can be repeated that "The work is to be regarded more as a source of information, a record of events and happenings, than a contribution towards the interpretation of those events." As a result of this method of treatment, one is left with the impression that the periods of prosperity and depression which are recorded were due, rather to the presence or otherwise of an enterprising Management than to general fluctuations of industry, to which there is scarcely any reference.

The book may also be criticised on account of its omissions. The question of wages and labour, for example, is virtually dismissed in the following sentence, "Apart from such matters as Labour unrest, Conciliation Boards, Strikes, and Government interference, common to all the railways, there is little to record during the last few years before the war" (p. 451). It is a pity also that the two maps supplied do not show anything like the total number of places referred to in the text, which makes the latter often difficult to follow.

Nevertheless, the Great Western can pride itself in possessing by far the most complete and authoritative history of any existing British Railway Company, and it is certainly interesting to be reminded that this Company ran road motor services in connection with their railway services as early as 1903 (p. 427), that rail cars, both steam- and petrol-driven, were introduced soon afterwards (p. 428), and that an arrangement for the pooling of all competitive traffic between London and Exeter was concluded with the L.S.W.R. in May, 1910 (p. 446).

G. J. PONSONBY.

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[1] See ECONOMICA, No. 23, p. 231.

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